



# **VIDEOJET FOCUS S25**

## **FIELD COMMUNICATION MANUAL**

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## Overview

Videojet has extended our laser product line with the introduction of the Videojet Focus S25 and the High Resolution laser marking products. The new S25 and the High Resolution laser products build from the successful and proven Focus 1000 10w laser, now known as the Videojet Focus S10.

This product overview is intended to provide sales personnel with knowledge on laser marking and Videojet's laser products. This guide should help you understand your customer's questions regarding laser marking.



Videojet Focus S25

Videojet Focus S10

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### KEY POINTS

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- What is a laser?
  - What are the S10, S25, and High Resolution printers?
  - Why launch the new S25 and High Resolution printers?
  - What is laser marking?
  - What substrates can we mark?
  - Sample Gallery
- 

## What is a laser?

The word laser is an acronym for “**L**ight **A**mplification by **S**timulated **E**mission of **R**adiation”. A laser tube is filled with gas that when excited with electrical energy, produces light energy or a laser beam.

The lasers used by Videojet are of the CO<sub>2</sub> (Carbon Dioxide) type, which falls into the infrared area of the light spectrum.

Videojet Focus S series printers contain sealed Synrad CO<sub>2</sub> lasers that output light energy at 10.6μm wavelength. VTI provides a 3-year warranty on the laser tube, guaranteeing that the laser tube power will remain at or above the specified systems specifications.

## What are the S10, S25, and High Resolution printers?

The MDS Focus 1000 has been re-branded as the Videojet Focus S10. We have re-branded to ensure that customers and prospects can easily, logically and clearly identify and assess our many product and service offerings. Additionally, we will leverage the Videojet brand name on all lasers products. Further, all new laser products will use a similar naming protocol that includes the Focus sub-brand. Accordingly, the new "Videojet Focus S25" name comprises the main brand and sub-brand, as well as a positioning indicator in the "family" of Focus lasers.

The Videojet Focus S25 was developed based on the Videojet Focus S10 architecture. We have benefited from the intelligent and modular design of the Focus platform. The Videojet Focus S10 has become well established, with sales continuing to grow. The new S25 (25-watt) steered beam printer allows us to leverage the success, reliability and solid construction of the S10 (10-watt) printer.

The High Resolution printhead is a new factory configuration for the Focus laser platform. As stated above, the Focus has a modular design that allows us to provide different printheads to customize our product for various applications. The High Resolution printhead includes special optics that provide a smaller spot size on the substrate being marked. The High Resolution printhead can be configured on both the S10 and the S25. We will discuss when to consider using the High Resolution printhead v. the standard printhead in the next section.



High Resolution Print  
Sample 1

## Why launch the new S25 and High Resolution printers?

Videojet is committed to solving customers' marking and coding needs. Accordingly, we must meet customers growing need for laser marking. The Focus S25 and the High Resolution printhead position Videojet with new laser products to solve more coding needs.

The Videojet Focus laser platform will provide customers with the most reliable laser products and allow Videojet to be the single supplier for all coding needs.

## What is Laser Marking?

Laser marking refers to marking by means of light energy. Energy is transferred from the laser beam to the substrate during the marking process. A mark is created through either the removal of material (vaporization), etching or inducing a color change in the substrate.

## What substrates can we mark?

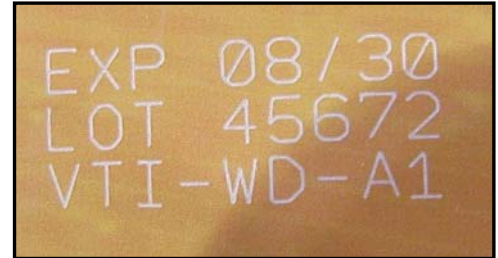
The table below provides a good overview of which substrates can be marked by CO<sub>2</sub> lasers. We recommend that you sample the substrate that is to be laser coded to confirm the suitability of laser coding.

Paper and Wood Based Substrates	SUBSTRATES	EXAMPLES	CO2 LASER SUITABILITY	NOTES
	Paper Stock	Labels/Food Boxes	Excellent	Excellent code if good contrast
	Chipboard	Secondary Packaging	Excellent	Excellent code if good contrast
Plastic Substrates	Wood	Doors, Window Frame, Decking	Good	Brown mark on natural wood
	PET/PETE (recycle code 1)	Soft drink containers	Excellent	Code is etched into the surface
	HDPE (recycle code 2)	Milk and detergent bottles	Poor	Poor code contrast
	PVC (recycle code 3)	Blister Packs, Vegetable Oil bottles	Excellent	Excellent contrast, gold color
	LDPE (recycle code 4)	Plastic bags, shrink wrap	Poor	Poor code contrast
	Polypropylene (PP) (recycle code 5)	Food containers, Audio Tapes	Good/Fair	Speed limitations
	Polystyrene (PS) (recycle code 6)	Meat Packing, disposable utensils	Good	Crisp, clean codes etched into surface
	Other (recycle code 7)	Layered/Mixed Plastics	Varies	Ability to code is dependent on surface layer
	ABS	Computer disks, Automotive parts	Good	Code is etched into the surface
	Nylon		Good	Code is etched into the surface, check contrast
Glass, Metal, Rubber, and Other Substrates	Glass	Bottles, Vials	Good/Fair	Good at lower speeds, produces glass dust
	Bare Metal	Tools, cans,	Poor	No mark without coating (paint or anodized)
	Anodized Metal	Automotive & aerospace parts	Good/Fair	Removes the anodized layer
	Neoprene	Hoses, Gasketing	Good	Code is etched into the surface, no color change
	Ceramic	Electronics	Poor	No mark without coating

## Laser sample gallery



Material Removal  
(Chipboard paper box)



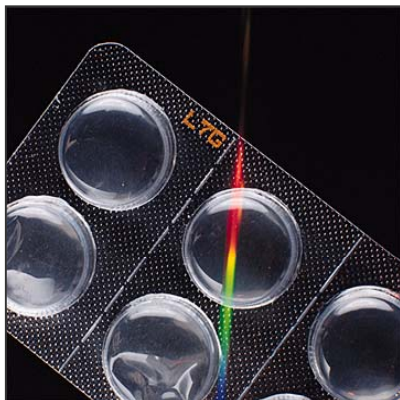
Material Removal  
(Paper label)



Etching  
(PET bottle)



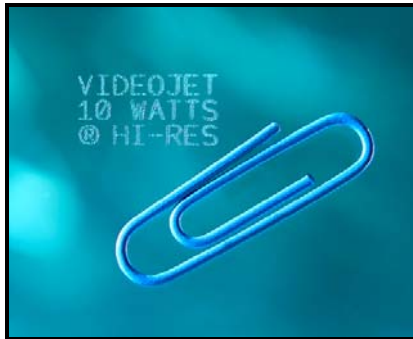
Etching  
(Plastic Automotive Part)



Color Change (PVC)



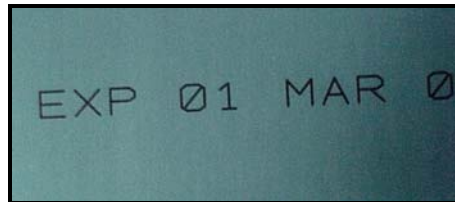
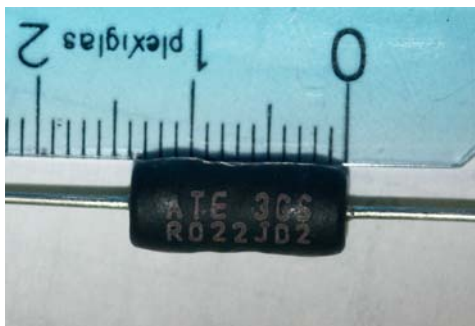
Color Change (PVC)



Etching (Glass)



Etching (Epoxy Coding)

Paint Removal  
(Metal cosmetic container)Coating Removal  
(Anodized Metal)

Electronics Part

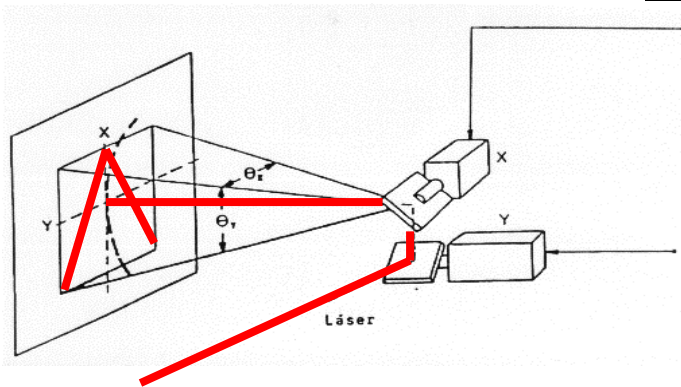


Coding Removal Cosmetic



## Overview

Steered beam lasers, also known as vector lasers, use laser energy in conjunction with galvanometers to create complete characters. A lens is used to focus the laser beam to a small spot on the surface of a moving or static product. Two galvanometer-driven mirrors move the laser spot over the surface of the product to draw the required mark or image. The units CPU controls the rotation of these two galvanometer-driven mirrors.



### POINTS

- What is the Videojet Focus Steered Beam laser?
- What power level should I choose?
- When should I use the High Resolution printhead?
- Which Focusing lens should I use?
- New software features
- S25 Specifications

## What is the Videojet Focus Steered Beam laser?

The Videojet Focus steered beam product family is available with a 10-watt laser tube, the S10 model, or a 25-watt laser tube, the S25 model. Additionally, you can stay with the standard printhead or you can select the High Resolution printhead, which provides a smaller spot size.

Both the S10 and the S25 use the industry proven Synrad laser tubes. Videojet offers a three-year warranty on our 10-watt and 25-watt laser tubes while all other parts have the standard one-year warranty.

## Which power level should I choose?

Marking speed is the primary difference between the S10 and the S25 lasers. The increased laser power of the S25 product will significantly increase the marking speed performance on many substrates. While actual performance is substrate



dependent, an increase of greater than 60% in marking speed has been demonstrated in marking chipboard and paper applications.

The following should be used as a guide so as to select the correct laser for the application. It is recommended that you consult with a laser application engineer to determine the best configuration.

1. What is the substrate?
2. What is the production line speed and product spacing at the marking location?
3. How many lines of print are required?
4. What are the message (code) specifications?
  - a. How many characters per line?
  - b. What is the font size or character height required?
  - c. How close/far does the printer need to be to the substrate?
5. Is there enough space to integrate the printhead?

We will look at each one of these variables individually.

Substrate: To create a laser mark, the substrate must absorb CO2 laser energy. Since all materials absorb energy at different rates, various materials will mark differently.

Production line speed and product spacing: The customer's production line speed dictates how much time the laser will have to print. If the line speed is such that one product passes by the laser every second (throughput), then that means the laser has to create a mark on the substrate within one second.

Message (code) specifications: The greater the number of printed lines, the larger the character height, and the longer or more complex the code, the more energy that is required to make that mark.

Printhead size: Please reference the drawings section for dimensions of the different products.

The amount of laser power available will determine the speed that the laser will be able to mark. The 25 watt laser tube in the S25 will provide more laser power than the 10w laser tube in the S10, but we want to determine the best product for the application. Submitting a laser sample to the sample lab is key in determining the proper product for the application. The S25 should be considered for applications where the S10 is too slow.

Typically, the S10 unit is sufficient for most static applications. In static applications the Focus dwell and resolution settings can be set high, as long as the item to be coded is in the stationary position long enough.

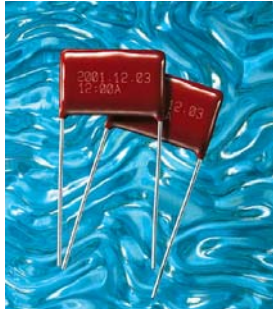
The table below provides some very general guidelines of laser print speeds on various substrates. As discussed above, the production line speeds given below are based on a single line message, 12 characters long, with a character height of 1/8" or 3.18mm, and using a 5" focal lens. Line speeds may also vary based on throughput (product spacing). Product spacing was not considered in the table below.

\* All customer samples should be sample lab for evaluation.

SUBSTRATE	LINE SPEED			
	10w CO <sub>2</sub>	25w CO <sub>2</sub>	40-60w CO <sub>2</sub>	100w CO <sub>2</sub>
Paper Coated Stock (glossy)	300fpm (91mpm)	675fpm (206mpm)	1200fpm (366mpm)	1500fpm (457mpm)
Paper Uncoated Stock	225fpm (69mpm)	500fpm (152mpm)	900fpm (274mpm)	1125fpm (343mpm)
Chipboard	330fp (101mpm)	700fpm (213mpm)	1320fpm (402mpm)	1500fpm (457mpm)
Wood	75fpm (23mpm)	170fpm (52mpm)	300fpm (91mpm)	375fpm (114mpm)
Glass	75fpm (23mpm)	300fpm (91mpm)	350fpm (107mpm)	450fpm (137mpm)
Painted Metal	170fpm (52mpm)	550fpm (168mpm)	680fpm (207mpm)	850fpm (259mpm)
PET/PETE	150fpm (46mpm)	340fpm (104mpm)	600fpm (183mpm)	750fpm (229mpm)
PVC	145fpm (44fpm)	265fpm (81mpm)	550fpm (168mpm)	700fpm (213mpm)
Polypropylene (PP)	60fpm (18mpm)	175fpm (53mpm)	240fpm (73mpm)	300fpm (91mpm)
Polystyrene (PS)	145fpm (44fpm)	215fpm (66mpm)	580fpm (177mpm)	700fpm (213mpm)
ABS	115fpm (35mpm)	320fpm (98mpm)	460fpm (140mpm)	575fpm (175mpm)
Rubber	125fpm (38mpm)	280fpm (85mpm)	500fpm (152mpm)	625fpm (191mpm)

## When should I consider the High Resolution printhead option?

The High Resolution printhead configuration reduces the laser spot size at the mark point. By decreasing the spot size, several print application advantages are gained. The advantages allow the system to produce very small images with high resolution and quality. By decreasing the laser spot size, energy density at the mark point is also increased. The increased energy density allows the laser to be more effective at creating images on harder to mark substrates moving at faster print speeds.



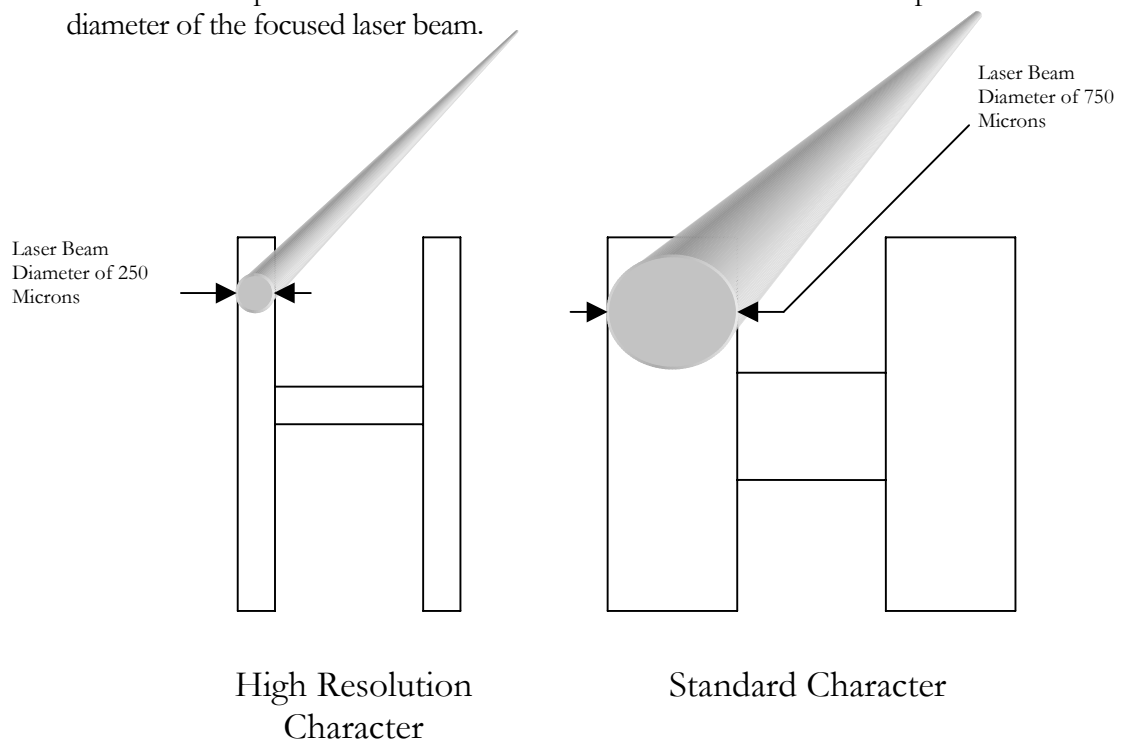
Electronics-Capacitor

Reduction in laser spot size is accomplished by incorporating a beam expander in the laser beam path. The beam expander increases the laser beam diameter prior to the final focusing lens. The increased diameter of the laser beam forms a smaller laser spot size at the working focal distance of the lens.

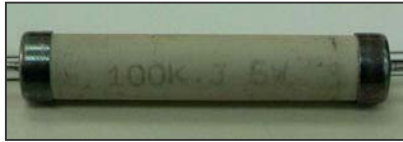


Electronics-Transistor

The result of reducing the spot size is illustrated below. A small well-defined character line allows the character resolution to be increased. The High Resolution printhead option produces a “sharper point” with which to write the code information. The Illustration below shows the 3:1 ratio that is typical with the high resolution versus standard Focus printhead. The thickness of the character sections corresponds to the diameter of the focused laser beam.

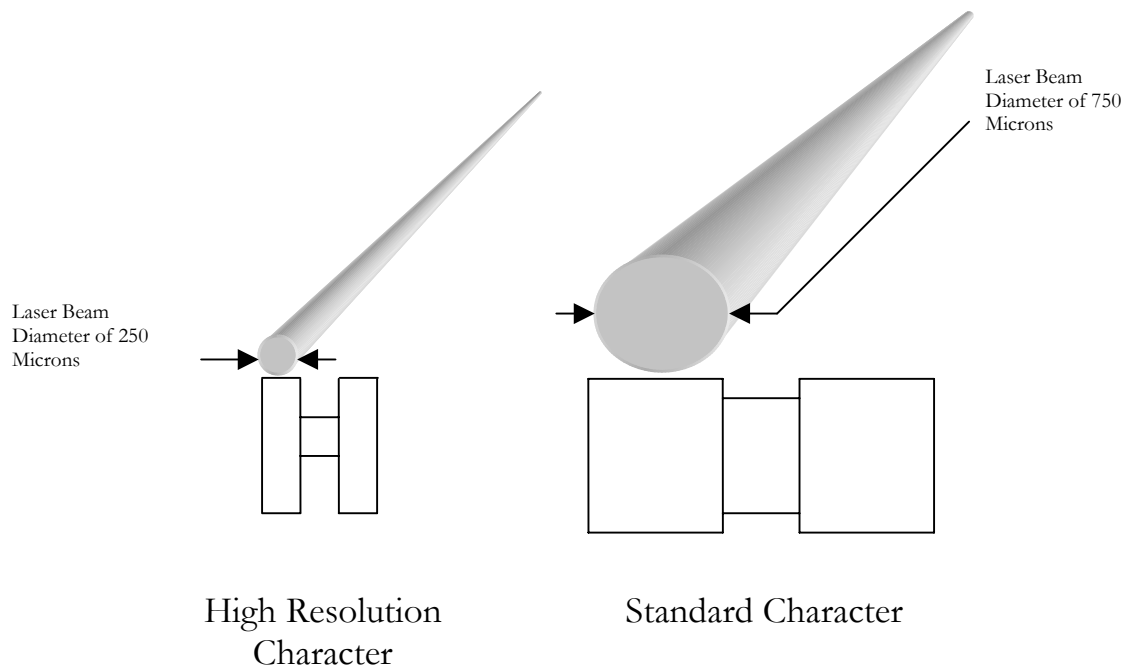


The beam thickness produced by the standard Focus head limits how small a character can be produced. The illustration below shows that the character can become



unreadable if the character size is reduced greatly using the standard head. However, when using the High Resolution printhead, the characters can be imaged down to sizes so small that magnification is required to read them.

Electronics-Resistor



The High Resolution Printhead option should be used when:

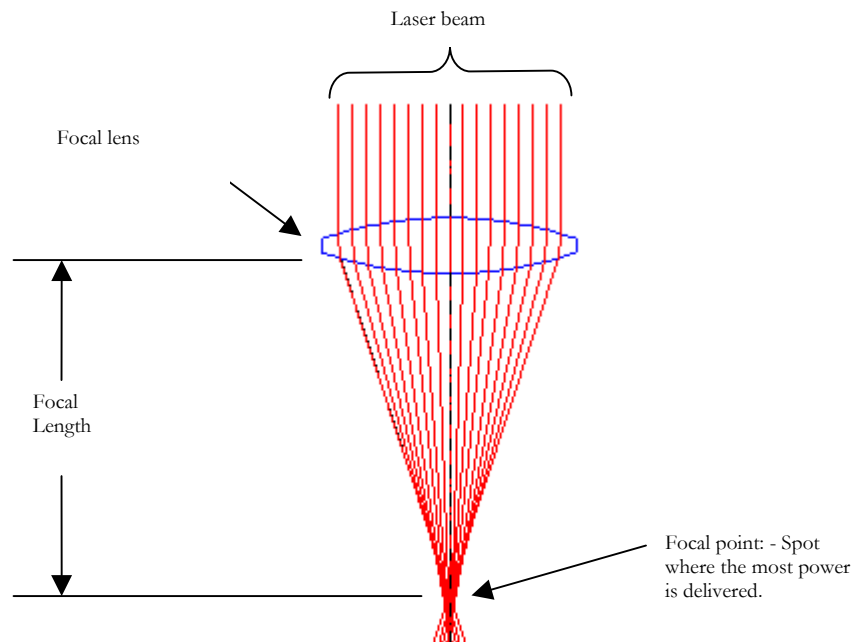
- The customer wants to mark on a very small part
- The customer needs to print smaller than 1/16 of an inch or 1.5mm
- The customer needs a very fine/thin code
- The customer is looking to place a large amount of data in a very small area

The High Resolution Printhead option is available on both the S10 and S25 units.

## Which focusing lens should I use?

When choosing a focusing lens there are two factors to consider: the Focal Length (also known as the Focal Distance or Working Distance) and the Marking Area (also known as the Print Window).

Focal Length: The focal length is the distance from the focusing lens to the substrate. The 5.0" (127mm) focal lens will come standard in all Focus printers. You will need to specify one of the other lenses (2.5" or 10") on the order if the customer requires one of the other focal length lenses.

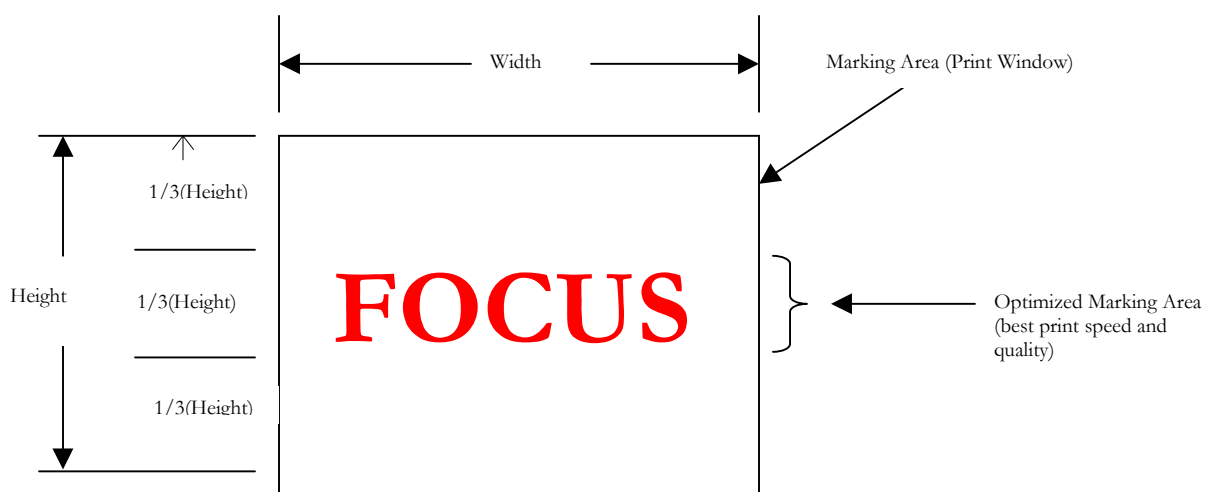


The focal lens selection in the Focus is mostly dependent on integration issues. If more or less working distance is required you may consider switching to one of the other focal lens options.

The following table indicates approximate working focal distances for the different focal lens available with the Focus lasers.

LENS	APPROXIMATE WORKING FOCAL DISTANCE			
	90 DEGREE STANDARD	STRAIGHT STANDARD	90 DEGREE HI-RESOLUTION	STRAIGHT HI-RESOLUTION
2.5" F.L.	2.45in 62.2mm	2.35in 59.7mm	2.29in 58.2mm	2.25in 57.2mm
5.0" F.L.	4.65in 118.1mm	4.20in 106.7mm	4.45in 113.0mm	4.35in 110.5mm
10.0" F.L.	9.50in 190.5mm	9.10in 180.3mm	8.90in 226.1mm	8.60in 218.4mm

**Marking Area:** The marking area is the dimensioned space in which a steered-beam laser is capable of marking. The focusing lens defines this area. The greater the focal distance of the focal lens, the greater the marking area.



LENS	APPROXIMATE MARKING AREA (WIDTH X HEIGHT)			
	90 DEGREE STANDARD	STRAIGHT STANDARD	90 DEGREE HI-RESOLUTION	STRAIGHT HI-RESOLUTION
2.5" F.L.	1.67 x 1.67in 42.4 x 42.4mm	1.96 x 1.96in 49.8 x 49.8mm	1.45 x 1.45in 36.8 x 36.8mm	1.45 x 1.45in 36.8 x 36.8mm
5.0" F.L.	3.34 x 3.34in 84.8 x 84.8mm	3.92 x 3.92in 99.6 x 99.6mm	2.90 x 2.9in 73.7 x 73.7mm	2.90 x 2.9in 73.7 x 73.7mm
10.0" F.L.	6.68 x 6.68in 169.7 x 169.7mm	7.84 x 7.84in 199 x 199mm	5.80 x 5.80in 147.3 x 147.3mm	5.80 x 5.80in 147.3 x 147.3mm

The marking area defines the maximum character height that can be printed. The best print quality is obtained at the middle 1/3 of the print height.

As the focal distance and marking area is increased, the laser power intensity is decreased, so the maximum marking performance will be degraded.

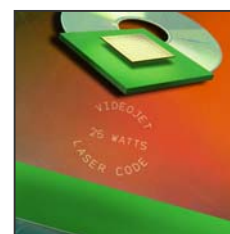
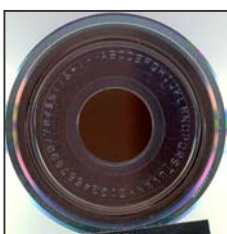
CRITERIA	FOCUS S10	FOCUS S25
ELECTRICAL		
Voltage/Frequency	220-240VAC, single phase, 50/60 Hz or 100-120VAC, single phase, 50/60 Hz.	
Current	3.5 Amps (Max)	4.5 Amps (Max)
Power Consumption	350 VA	450 VA
ENVIRONMENTAL		
Humidity	5% to 95% non-condensing	
Storage Temperature	20°C to 60°C (-4°F to 140°F)	
Storage Humidity	5% to 95% non-condensing	
TEMPERATURE		
Ambient Temperature	Duty Cycle While Printing	
48.9 C (120 F)	20%	
46.1 C (115 F)	40%	
43.3 (110 F)	60%	
37.8 C (100 F)	80%	
35 C (95 F)	100%	
PRINTER ENCLOSURE		
Dimensions	See drawings chapter	
Weight	35 lbs. (approx.), 16kg (approx.)	65 lbs. (approx.), 30kg (approx.)
Material	Stainless steel	
HANDHELD TERMINAL		
Keyboard	Forty-key tactile membrane keypad.	
Format	Letters "A" - "Z" in Alpha order with shift-key access to shared letters 10-digit numeric keypad Five function keys Four arrow keys	
Screen Type	Supertwist liquid crystal display	
Screen Size	4 rows with 20 characters each	
Dimensions	Width: 4 1/8 inches (106mm) Height: 7 2/3 inches (195mm)	
MESSAGE STORAGE		
Capacity	Up to 20 messages (numbered from 1 to 20) with 1, 2 or 3 lines of 100 characters per line	
SHAFT ENCODER INPUT		
Voltage Supply	+5VDC preferred (+12VDC jumper-selectable) Differential, RS422, Quadrature	
Signal Input	Differential, RS422, Quadrature	
Current	200mA maximum	
Input Pulses	30 pulses per millimeter of product movement recommended.	



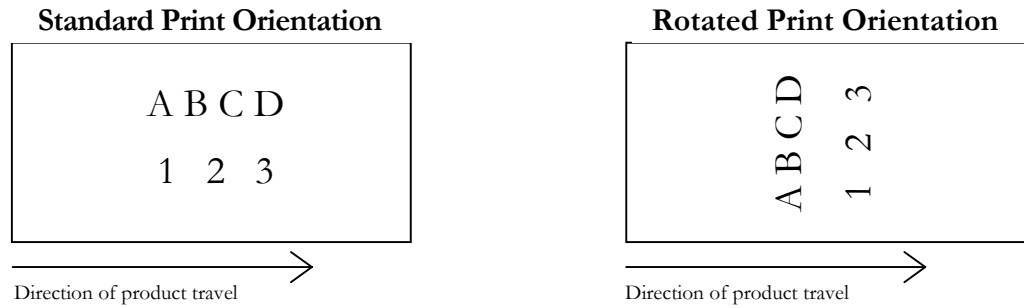
PHOTOCELL INPUT (PRODUCT DETECTOR)		
Voltage Supply	+12 VDC preferred (+5 VDC jumper-selectable)	
Signal Input	NPN (sink) preferred (PNP, source, jumper-selectable)	
Current	200mA maximum	
AUXILIARY INPUTS/OUTPUTS		
Mark On	Outputs when the laser is firing (preferred optically isolated, 50 VDC, 30 mA, jumper selectable)	
Interlock	Typically used with the beam shield guard door. When the interlock opens, it disables the laser.	
Alert Light (Output)	May use with the Videojet alert light or a customer alert system (30 VDC, .5A).	
Print On/Off (Output)	Typically indicates when the system is in print mode (normally optically isolated, 50 VDC, 30 mA).	
Print Demand (Output)	Indicates when the system receives a product detection signal from the product detector. (Is normally optically isolated, 50 VDC, 30 mA.) For detailed information, see the <i>Service Manual</i> .	
DC Power (Output)	Can be configured to power custom interlocks or alert lights.	
LASER TUBE		
Type	CO <sub>2</sub>	CO <sub>2</sub>
Class	Class IV	Class IV
Power	10 watts	25 watts
Wavelength	10.6 μm	10.6 μm
Beam Geometry	3.5 mm (1/e <sup>2</sup> ) millimeters diameter	3.5 mm (1/e <sup>2</sup> ) millimeters diameter
COOLING SYSTEM		
Type	Air-cooled	
LENS PROTECTIVE AIR FLOW (RECOMMENDED)		
Pressure	15 psi to 30 psi recommended	
Quality	Instrument quality, filtered to .03 microns, no more than 1 PPM oil content, and 99% water free.	
FOCAL LENS		
Focal Length	Standard: 5.0 inch (127 mm) Options: 2.5 inch (63.5 mm) 10 inch (254 mm)	
Material	Zinc Selenide (ZnSe)	

## New Software Features

Circular Message Printing has been introduced into this version of software. An example of a circular message print application is imaging on round products such as audio and data compact disks (CD's), and container caps.



Rotated Message Printing capabilities have been added to the Focus software. The rotated print capabilities will be available with an SAR until December at which time they will become a standard part of the software.



The rotated print will be dependent on the marking area or print window available as described above in the discussion on lens selection. Additionally, speed will be dependent on the amount of data printed since in the rotated print orientation more data may need to be printed over a smaller area.

## Overview

Customers are increasingly looking towards laser marking to solve their product identification needs. Lasers are a reliable way for customers to cleanly mark their products with a permanent mark. Additionally, since there are no consumables, operating costs are lower than other technologies. The vertical markets that have adopted lasers vary by region throughout the world. Rigid packaging is a common method used in packing non-durable consumer goods in North America and Europe. Rigid packaging is a paper-based product that is very receptive to CO<sub>2</sub> laser marking. Rigid packaging is also known as chipboard, printed cardboard, or claycoat and is a primary target for the Focus products. In the Asia Pacific region, the dominant markets such as the electronics and automotive industries have adopted lasers. In these industries, marking on plastics and glass are more common.



### KEY POINTS

- What are the Features and Benefits of the Focus?
- Who are the target customers?
- Laser v. Other Technologies
- Identifying a laser application

## What are the Features and Benefits of the Videojet Focus S10 and S25 laser printers?

FEATURE	BENEFIT
Stainless Steel Construction	Durability
Simple User Interface	Easy to Operate
Clean Operation	No mess
Laser Marking	Permanent Code
High Resolution Print	Very small print, better on some plastics
Small Footprint	Ease of integration, flexibility, no external control cabinet or PC
Scaleable Print	Change code size on the fly

## Who are the target customers for EMEA and North America?

1. Food & Beverage (chipboard, paper, and plastic based products)
2. Consumer Packaging (chipboard, paper, and plastic based products)
3. Pharmaceutical (chipboard, paper and plastic based products)

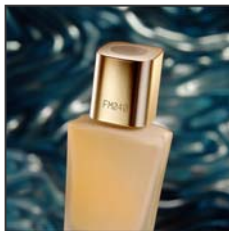


Rigid packaging, which is a paper-based substrate, (often referred to as chipboard or claycoat) is an excellent application for the Focus lasers. Paper labels are also a primary target application for the Focus lasers. Further, many plastic parts used in the food & beverage, consumer packaging and pharmaceutical markets can be marked with CO2 laser.

	FOOD	BEVERAGE	CONSUMER PKG.	PHARMACEUTICAL
# Of customers	>1000	>1000	>1000	100's
Environment used	Harsh	Harsh	Clean/Dusty	Clean
Need to have	1. Reliability 2. Speed	1. Reliability 2. Speed	1. Reliability	1. Reliability 2. Permanency 3. Cleanliness
Examples of Applications	Cereal Cartons, Crackers (Chipboard), Salad Dressing (PET), Mayonnaise (Glass, Paper labels).	Canned cartons (Chipboard) Soft Drink bottles (PET), Wine bottles (Glass, Paper label)	Tobacco (Paper), Shampoo (Plastic), Tampons (Chipboard)	Bottle labels (Paper/Plastic), Syringes (Plastic), Tubes (Painted metal), Vials (Glass), Blister packs (Metal foil)
Line Speeds Low < 50fpm Medium 50 - 200fpm High 200 - 600fpm Very High >600fpm	Low - High	Low - Very High	Low - Medium	Medium
Typical Message Requirement	Mfg date, exp date, time code, lot code, mfg facility, production line	Mfg date, exp date, time code, lot code, mfg facility, production line	Mfg date, exp date, time code, lot code, mfg facility, production line	Lot/Expiration, potential dosage level barcode

## Who are the target customers for the Asia Pacific region?

1. Electronics (plastics, coated ceramics, epoxy, etc)
2. Automotive (glass, plastic, rubber, foam, anodized metal, etc)
3. Cosmetic (plastic, glass, coated metal, makeup, etc)



The electronics industry is the biggest industry throughout most of the Asia Pacific region. Additionally, Asian-based automobile manufacturers have integrated laser-marking processes that are the most advanced of anywhere in the world. Finally, the cosmetics market uses laser to create a permanent mark that will prevent counterfeiting.

	ELECTRONICS	COSMETICS	AUTOMOTIVE
# Of customers	>1000	1000's	1000's
Environment used	Clean	Clean	Harsh
Need to have	1. Reliability 2. Cleanliness (no VOCs)	1. Reliability 2. Permanency (anti-counterfeit)	1. Reliability 2. Permanency
Examples of Applications	Semiconductors (Plastic/Ceramic), Resistors, Capacitors, PCBs, Connectors, etc (Plastic)	Lipstick (Plastic), Packaging Container (Chipboard box), Perfume Bottle (Glass), Makeup Compact (Directly Mark on Makeup), Container (Painted Metal)	Door molding (Rubber), Windshields (Glass), Auto/Aerospace parts (Plastic, Rubber, Foam, PVC, etc.)
Line Speeds Low < 50fpm      Medium 50 - 200fpm      High 200 - 600fpm      Very High >600fpm	Low	Medium	Low
Typical Message Requirement	Part number, serial number, mfg date, barcodes	Mfg date, time code, lot code, mfg facility, production line, logos for anti- counterfeiting	Part number, serial number, mfg date, barcodes, logos

## Laser versus other technologies

### Focus Laser Marking comparison to Embossing, Hot Stamping or Roller Coders

	LASER	EMBOSSING, HOT STAMPING, ROLLER CODERS
Reliability	Highly reliable, few moving parts, small number of total parts	Very reliable with routine maintenance
Operating Costs	Very low	Low
Substrate Suitability	Must be receptive to CO2 energy. Limitations on some substrates (bare metals)	Selection of ink colors and dry times
Contact Substrate	On-the-fly marking	Direct contact with substrate
Print Variable Info.	Able to print variable data such as time, date, shift codes, etc. real-time	Cannot print variable data. Operator must change stamp or roller to change the code
Production Line Speed	Must be suited to the application. Often dependent on laser power available	Limited based on need to transfer ink or stamp through contact
Capital Costs	10-watt laser prices average < 15,000 USD. 25-watt lasers priced about \$25,000 USD	Low
Permanence of code	Indelible. Durable as the product surface	Varies. Dependent on the substrate and the ink type. Indelible for stamping.
Ease of Use	Very simple, limited knowledge required to operate and maintain	Requires regular user interface to replenish ink and change stamps
Maintenance	Clean lens and filters as needed	Routine maintenance to clean ink and change codes
Safety	A proper installation with a beam shield and fume extraction will not present any hazards	Proper handling, storage and disposal of inks

### Focus Laser Marking comparison to Continuous Inkjet

	LASER	INKJET
<b>Reliability</b>	Highly reliable, few moving parts, small number of total parts	Very reliable with routine preventative maintenance
<b>Operating Costs</b>	Very low	Consumables costs
<b>Substrate Suitability</b>	Must be receptive to CO2 energy. Limitations on some substrates (bare metals)	Wide selection of ink colors and dry times
<b>Production Line Speed</b>	Must be suited to the application. Often dependent on laser power available	Able to meet most production line speed requirements
<b>Capital Costs</b>	10-watt laser prices average < 15,000 USD. 25-watt lasers priced about \$25,000 USD	Prices fluctuate significantly by region ~ 10,000 USD
<b>Permanence of code</b>	Indelible. Durable as the product surface	Varies. Dependent on the substrate and the ink type
<b>Ease of Use</b>	Very simple, limited knowledge required to operate and maintain	Requires regular user interface to replenish fluids and clean printhead
<b>Maintenance</b>	Clean lens and filters as needed	Routine maintenance to change filters, clean printhead
<b>Safety</b>	A proper installation with a beam shield and fume extraction will not present any hazards	Proper handling, storage and disposal of solvents and inks required.

## Identifying a laser application

10 questions that can be asked to help identify a laser application:

1. Do you currently use ink jet or laser coders? Which ones?
2. What is the most important characteristic of this code? (Production speed, downtime, resolution, machine-readable, etc.)
3. Do you need a permanent code?



4. Will you buy this equipment if successful? (If so, then issue PO with performance promise)
5. Laser is justified based on what criteria? (VOC reduction, increased reliability/uptime, etc.)
6. Is there money budgeted and available? How much? What is your capital budget?
7. Will this trial serve as a trial for multiple locations?
8. Does this location control or influence the decision? Who else influences this decision?
9. What is the total potential for laser sales of this order and in the future?
10. Have you considered other laser vendors? Who?

## Overview

Laser competitors are based in all regions of the world. For simplicity, the competitors described below are segmented based on the region they are headquartered, though nearly all competitors sell or distribute their lasers products globally. The general trend has been towards steered beam lasers since the quality of the steered beam code is often preferred to dot matrix. Further, the competitive analysis below identifies some of the key strengths and weaknesses of Videojet's main laser competitors. Videojet has an opportunity to address the competitors strengths and to us their weaknesses to our advantage.

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**KEY POINTS**

---

- U.S.-based competition
  - Europe-based competition
  - Asian-based competition
- 

## U.S. based laser competition

- Markem
- IDC – Lasetec
- Lasertechnics

### *Markem*

Markem only has one CO<sub>2</sub> laser product the 10w Smartlase. Markem aggressively attacks the CIJ install base since they do not have CIJ product or a CIJ install base.

We need to present the Videojet S10 laser when we come into competition with the Markem Smartlase.

**Markem Smartlase**

**Laser tube:** 10 watt

**Cooling:** Air-cooled

**Enclosure:** Plastic and painted metal

**Environmental protection:** Optional stainless steel enclosure for wet environments

**Display:** Text based user interface

**MARKEM STRENGTH:** The Markem Smartlase is ease to integrate because of their adjustable optic output.

**Adjustable  
optical output**



**VIDEOJET OPPORTUNITY:** We can configure the S10 & the S25 to print 90 degrees or straight out. The Focus lasers can be ordered from the factory in either configuration or they can be converted in the field.

**MARKEM WEAKNESS:** The only Markem CO<sub>2</sub> product is the 10 watt Smartlase. They do not have any higher power laser product.

**VIDEOJET OPPORTUNITY:** Higher speed applications are going to require more power. Videojet can offer the S25 product. Additionally, the High Resolution Printhead allows the Focus to create a very small spot size and mark on parts that the Smartlase cannot.

**MARKEM WEAKNESS:** Markem does not have a strong service organization network in many areas. If there is a product failure the customer is required to send the laser back to Markem and a replacement unit is sent out to the customer. The customer has to replace and set up the unit to get their production line back up.

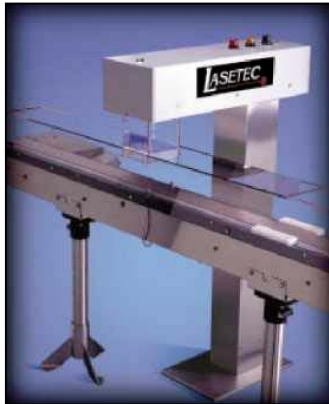
**VIDEOJET OPPORTUNITY:** Videojet will support our products anywhere in the world with the best sales force, distributors, and service force of any competitor.

**MARKEM WEAKNESS:** The Markem Smartlase has difficulties at higher ambient temperatures. The unit is not efficiently cooled.

**VIDEOJET OPPORTUNITY:** In higher ambient temperature or high duty cycle applications the Markem Smartlase fails. The Focus products operate at the highest temperature in the industry. The Focus has been tested head-to-head against the Smartlase in high temperature customer environments. The Focus keeps running while the Smartlase overheats.

### *Industrial Dynamics Corporation - Lasetec*

Industrial Dynamics is best known for their Filtec product line. The Filtec product line consists of verification and fill inspection equipment for the beverage industry. Filtec has a strong brand name and the top market share in the beverage industry. IDC's other business division is Lasetec, a laser marking company. Lasetec leverages Filtec's reputation to sell lasers.



**Laser tube:** 10 watt, 25 watt, 50 watt steered beam

**Cooling:** Air-cooled, water cooled for higher power levels

**Enclosure:** Stainless steel

**Environmental protection:** Claim option for NEMA 4

**Display:** GUI with keypad

**LASETEC STRENGTH:** IDC has Filtec equipment integrated in the beverage industry. The existing relationship gives Lasetec the opportunity to demonstrate their laser products.

**VIDEOJET OPPORTUNITY:** Videojet has a strong relationship with the beverage industry. Videojet products have been the first choice for marking and coding of beverage products for many years.

**LASETEC WEAKNESSES:** The Lasetec products have a large footprint with a separate enclosure for the electronics.

**VIDEOJET OPPORTUNITY:** Videojet's S10 & S25 have a smaller package size than the respective Lasetec products.

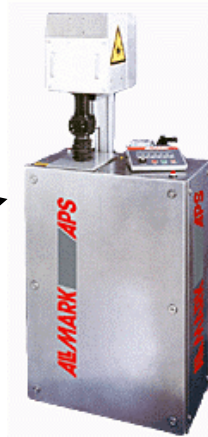
**LASETEC WEAKNESSES:** IDC does not have the service and support structure in place to support large customers or remote regions.

**VIDEOJET OPPORTUNITY:** Videojet will support our products anywhere in the world with the best sales force, distributors, and service force of any competitor.

### *Lasertechnics*

Lasertechnics is primarily a distributor of other companies laser products. They distribute Rofin-Sinar's high speed rotating polygon dot matrix laser (FlexScan) two Alltec steered beam lasers and an Alltec mask laser. They have an existing presence with some key customers with their mask laser printer, which has now been replaced by Alltec's. The mask laser is old technology that is large, unable to print variable data, and requires flowing CO<sub>2</sub> gas.

Lasertechnics  
distributes  
Alltec's mask  
(stencil) laser



**Laser tube:** 10, 25 steered beam & 100 watt dot matrix products

**Cooling:** air and water

**Enclosure:** stainless steel

**Environmental protection:** Alltec Allprint Smart claims IP64 for enclosure. The Alltec Allprint CS has no IP claims



Alltec Allprint CS Series

August 20, 2002

**Display:** Steered beam products have option handheld or PC interface

**LASERTECHNICS STRENGTH:** Lasertechnics can supply a full laser product line.

**VIDEOJET OPPORTUNITY:** Videojet's launch of the S25 closes the CO2 laser product line gap.

**LASERTECHNICS WEAKNESSES:** Lasertechnics FlexScan (rotating polygon) product delivers the laser beam through an articulated arm. The articulated arm does not allow for flexible integration. Additionally, if the articulated arm is bumped or picks up vibration from the production line dots in the code are lost.



Lasertechnics FlexScan

\* Also note Image distributes a similar Rofin-Sinar rotating polygon dot matrix laser printer

**VIDEOJET OPPORTUNITY:** Videojet's S25 will be able to meet the requirements of some of the applications when competing against the Blazerjet (sampling required). The steered beam code appearance is preferred to the dot matrix code.

**LASERTECHNICS WEAKNESSES:** Lasertechnics has a weak service and support infrastructure. Lasertechnics also has difficulties responding quickly to special customer requests since they rely on various laser printer manufacturers for support.

**VIDEOJET OPPORTUNITY:** Videojet will support our products anywhere in the world with the best sales force, distributors, and service force of any competitor.

## Europe based laser competition

- Domino/Sator
- Linx
- Alltec

*Domino/Sator*

Domino has an established high speed DDC3 dot matrix laser product. Domino sells the DGM-1 steered beam laser printer that is manufactured by Synrad. The DGM-1 printer requires a PC to operate the unit. Domino also sells the DSL steered beam laser line. These lasers are available in 10 - 100 watt power options. Finally, Domino has recently launched a new steered beam product the S200 that is based on the same laser tube technology as their DDC3.



**Domino - DSL1**

**Laser tube:** 10, 25, 50, 100 watt steered beam

**Cooling:** Air-cooled except for the 100 watt

**Enclosure:** Stainless steel

**Environmental protection:** Printhead has many open vents

**Display:** GUI

**DOMINO STRENGTH:** Domino provides a full laser product line

**VIDEOJET OPPORTUNITY:** Videojet's launch of the S25 closes the CO2 laser product line gap.

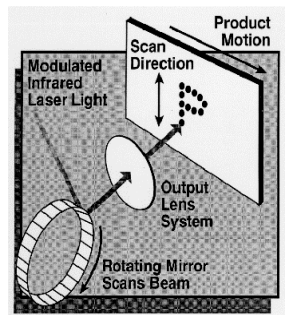
**DOMINO WEAKNESS:** The Domino lasers have a large electronics control cabinet 19" x 15" x 9" (483mm x 381mm x 229mm) weighing 70lbs (32kg)

**VIDEOJET OPPORTUNITY:** The small and simple Focus interface allows customers to easily integrate our printer into their production area. Additionally, customers are quickly able to operate the Focus printer.

*Linx*

Linx acquired their laser products from the Lumonics product line. The Linx EFX products direct a laser beam onto a rotating polygon (multi-faceted wheel with reflective surfaces). As the polygon rotates the Linx system pulses the laser (turning it on and off), which creates individual dots. Each dot has a specific position and then must travel through the articulated arm before marking on the product. Linx does not have any low powered laser products 50 watts is the lowest power product that they provide.





**Laser tube:** 50, 80 and 100 watt dot matrix laser

**Cooling:** Integral air to water heat exchanger

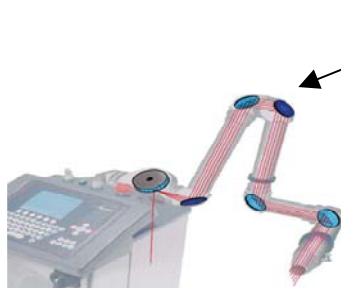
**Enclosure:** Stainless steel

**Environmental protection:** IP56 claims

**Display:** Text based user interface QWERTY keypad

**LINX STRENGTH:** Linx through the use of their articulated arm beam delivery have a small printhead that can fit into small spaces.

**VIDEOJET OPPORTUNITY:** The rotating polygon technology with the articulated arm is difficult to integrate and susceptible to misalignment. The Focus laser is durable and does not lose parts of the code when the unit is bumped or subjected to normal vibration.



Each dot has a different positioned laser beam and all must remain aligned through each bend until finally reaching the output

**LINX WEAKNESS:** Dot matrix print quality.



A missing row of dots from a Linx print sample

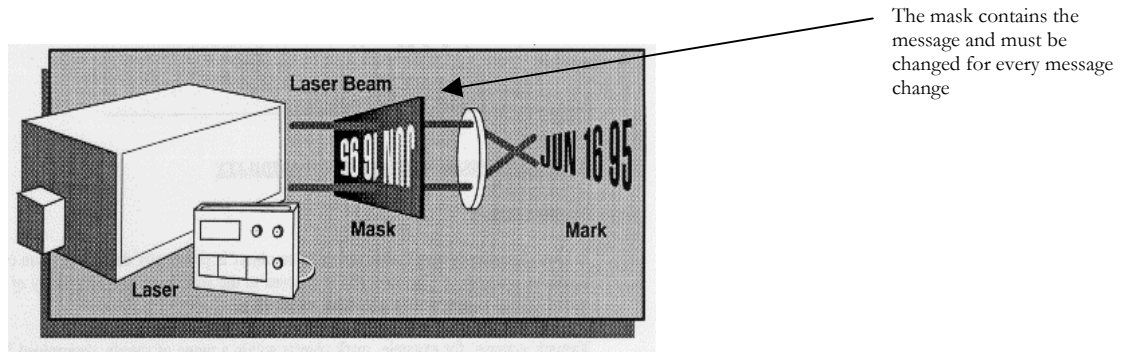
**VIDEOJET OPPORTUNITY:** Customers prefer the steered beam character formation provided by the Focus products to dot matrix codes.

**LINX WEAKNESS:** The Linx system has to compete against smaller footprint steered beam lasers for low speed applications

**VIDEOJET OPPORTUNITY:** The Focus lasers have a smaller footprint than the Linx product line with the separate controller. Additionally, the S10 Focus has been able to mark products at higher line speeds on chipboard than the 50 watt EFX.

### *Alltec*

Alltec has been in the laser business for many years. They have sold mask (stencil) lasers into many industries. As noted above, mask (stencil) lasers are old technology due to their lack of ability to print variable information, size and consumables. They now focus on their steered beam laser business.



**Laser tube:** 10, 25, 50, and 100w steered beam

**Cooling:** air-cooled & water cooled for higher power levels

**Enclosure:** Stainless steel

**Environmental protection:** Claim IP64

**Display:** Handheld, GUI, and PC

**ALLTEC STRENGTH:** Alltec offers a full steered beam laser product line.

**VIDEOJET OPPORTUNITY:** Videojet's launch of the S25 closes the CO2 laser product line gap.

**ALLTEC WEAKNESS:** The Alltec Allprint CS lasers have a separate rack mounted electronics control cabinet.



**Rack  
mounted  
electronics  
cabinet**

**Alltec Allprint CS Series**

**VIDEOJET OPPORTUNITY:** The small size of the Focus printers does not take up much of the customer's valuable production space.

**ALLTEC WEAKNESS:** The Allprint Smart has a very large footprint and the printhead is connected and cannot be removed from the base unit making it very difficult to integrate onto many production lines.



**The Alltec Smart  
Laser printhead is  
attached to the main  
cabinet creating a  
large footprint &  
difficult integration**

**Alltec Allprint Smart**

## **Asian based laser competition**

- Keyence
- Sunx

*Keyence*

Keyence is the 10-watt CO2 market leader in Japan. They are primarily focused on the Japanese market. They have moved into other Asian countries but focus on Japanese companies in foreign countries. Keyence has strong sales into the electronics industry. They have a large laser sales force in Japan.

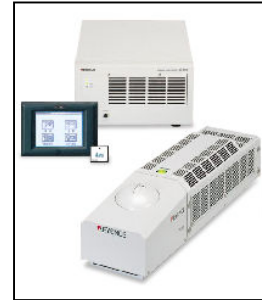
**Laser tube:** 10 watt steered beam

**Cooling:** Air-cooled

**Enclosure:** Painted steel

**Environmental protection:** None

**Display:** GUI interface



**Keyence ML9110**

**KEYENCE STRENGTH:** Asian interface, Japanese character set, barcodes for electronics industry.

**KEYENCE WEAKNESS:** Numerous vents and openings. Lacks environmental protection. Adequate for the clean environment of the electronics industry, but will have difficulties in dusty environments.

**VIDEOJET OPPORTUNITY:** Videojet's lasers use filters that protect the unit from dust and can easily be cleaned without taking the unit off-line.

**KEYENCE WEAKNESS:** Separate box required for the electronics.

**VIDEOJET OPPORTUNITY:** Videojet's lasers have a smaller footprint since all of the electronics are included in the main unit.

**KEYENCE WEAKNESS:** Keyence service and support is lacking especially outside of Japan.

*Sunx*

Sunx sells CO2 lasers that are very much the same as the Keyence lasers described above. Sunx recently launched a 25-watt laser.

**Laser tube:** 10-watt and 25-watt steered beam

**Cooling:** Air-cooled

**Enclosure:** Painted steel

**Environmental protection:** None

**Display:** GUI interface



**SUNX STRENGTH:** Asian interface, Japanese character set, barcodes for electronics industry.

**SUNX WEAKNESS:** Numerous vents and openings. Lacks environmental protection. Adequate for the clean environment of the electronics industry, but will have difficulties in dusty environments.

**VIDEOJET OPPORTUNITY:** Videojet's lasers use filters that protect the unit from dust and can easily be cleaned without taking the unit off-line.

**SUNX WEAKNESS:** Separate box required for the electronics.

**VIDEOJET OPPORTUNITY:** Videojet's lasers have a smaller footprint since all of the electronics are included in the main unit.

**SUNX WEAKNESS:** Sunx service and support is lacking especially outside of Japan.

The following document has been created to assist in the formal quote process. The parts and accessories offered with the Focus S series lasers are described and most are pictured below.

## Laser Unit

375659	Videojet Focus S10
375840	Videojet Focus S25

## Language Kit – *must select one kit per unit*

The language kit consists of the proper country's power cord, as well as all warning labels and the operator manual in the selected language.

## Factory Installed Options



### *Straight Head Cover Factory Installed (375798)*

Used when the 90-degree head cover will not allow for suitable space for mounting and operation of the laser printer.

### *High Resolution – Straight out Configuration (375780)*

### *High Resolution – 90 degree Configuration (375819)*

## Accessories

### *Shaft encoder (375384)*

A shaft encoder is a **required** accessory when printing in a **dynamic** (moving) application. The shaft encoder provides the printer with pulses that are used to monitor the line speed of the conveyor. These pulses are then translated through the CPU, to regulate the speed and direction of which the galvanometer motors are required to travel in order to produce the customer's code in the time allowed by product travel.



*Product Detector 375443-01 (infra-red)  
or 375443-2 (through beam)*



**Infra-red** (375443-01) product detector also known as a proximity product detector, used in most applications, and when a through beam detector is not possible.

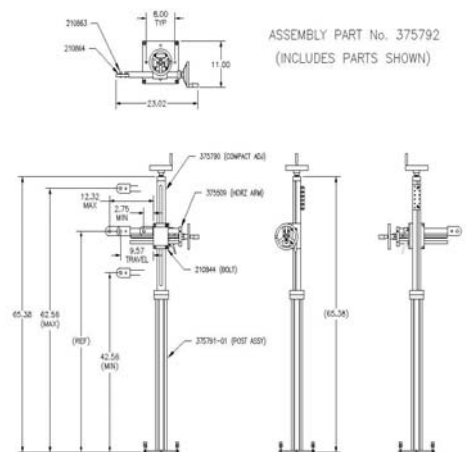
**Through beam** (375443-02) product detector is used as a “make break” detector. Produces a beam with a send on one side of a conveyor, and a receive on the other side of the conveyor. (Shown left.)

*Print head Adapter Plate (375713)*

The printhead adapter plate is required **only** when using our printhead stand. It is used to attach the printer to the stand.

*Print head Stand (375874)*

A new modular printhead stand design is being made available. The new printhead stand is arranged so that only the components necessary to mount and adjust the printhead need to be ordered. The design is compact and the multiple component configuration makes it highly flexible and easy to install. Two axis adjustments allow positioning of the printer for working focal distance and code position on the product. The adjustments are performed by turning a handwheel located on each axis assembly. The new printhead stand assembly and components are described below. The printhead adapter bracket P/N **375713** and stand base plate P/N **375173** must be ordered separately. The new printhead stand can be used for all versions of the Focus printer as well as the LaserProDM.



*Fume Extractor 212227(FA2) or 216067(RX2)*

This is a Fumex brand fume extraction unit designed to remove the smoke and dust particles associated with laser marking. It is recommend in all applications, and is required in PVC marking. To find more information, visit Fumex at [www.fumexinc.com](http://www.fumexinc.com).

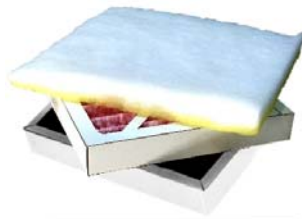
RX2 - Fume Extraction – (110v 60Hz only) Air flow specification is 160 scfm (clean filters)

A typical application for the compact extractor would be similar to the application described below:

- 24-pack chipboard case application
- Single Focus S-Series printer
- 15 character single line code
- Character size .10" wide x .12" tall
- 15% print duty cycle
- Product speed 70 fpm
- Production 80 hours per week



*P/N 216067 Filter, Polyester, Dust/Fume Extractor, Compact*



This photo displays the filters resident in the RX2.

The following photos show the FA2 Fumex model and its filters.



*Pleated Pre-filter  
(210375)*



*Activated carbon filter  
(210377)*



*Panel filter*



*HEPA filter  
(210376)*

- FA2, 120V 60Hz Air flow specification is 250 scfm (clean filters)
- FA2, 220V 60Hz Air flow specification is 267 scfm (clean filters)



*Beam Shield Kit 375265*

The beam shield kit contains 4 pieces of Polycarbonate, each measuring 2ft by 4ft and 0.5 inches thick, as well as a carbon block and magnetic interlock with DB 15 connector wired for the Focus.

*AC Power Conditioner 356841-05 (10- watt system) 60 Hz  
or 356841-10 (25-watt system) 60Hz*

This accessory is recommended for customers who have unclean power in their facilities. It is designed to minimize the effects of surges and voltage changes and their effects on the printer. We recommend the AC power conditioner to ensure trouble free operation. These power conditioners are configured for 60Hz only.

*Focus Positive Air Kit 375787*

The purpose of this kit is to provide air to the laser head to assist in keeping the printhead optics free from dust particles. The kit includes tubing and air fittings to connect the Videojet air prep kit P/N 370671 to the Focus laser head.

*Visible Laser Diode 375764*

This accessory was developed to assist in the setup process. It creates a visible laser on a parallel path with the CO<sub>2</sub>.

*Ultrasonic jam sensor/product detector (375496)*

The ultrasonic jam sensor is used when a conveyor constantly runs, and the product is known to jam in front of the laser printer. The ultrasonic jam sensor senses how long a product is stationary in front of the sensor, and based on set values, will discontinue sending product detect signals to the printer until product travel resumes. When using an ultrasonic jam sensor, you will not need to have a standard product detector. The most common application for the ultrasonic jam sensor is PET bottling lines.



## Software Accessories

There are two software accessories available for the Focus S series.

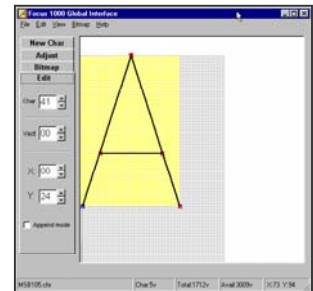
They are offered as a package (375753), which includes a null modem cable, the PC Interface program and the Global Font Interface program.

### *PC Interface program*

This program is used to interface with a PC to control the printer instead of using the handheld controller. It will also provide on-line help with printer controls such as editing a message and print adjust functions. The on-line help provides the user with information in six languages including Danish, Dutch, English, French, German, Italian, Japanese, and Spanish.

### *Global Font Interface*

This program is used to change the printer's font set as well as create simple logos. The program allows the customer to change the font set within the printer to their desired font. It will also allow for the creation of simple logos.



**A typical laser marking system will consist of:**

- Laser printer (S10, S25, or High Resolution versions)
- Language kit (consists of the appropriate country's power cord, translated warning decals on the printer, and translated operator manual)
- Power conditioner
- Fume extraction unit
- Beam shield kit (consists of 4 pieces of Polycarbonate each measuring 2 foot by 4-foot, .5 inches thick, as well as a carbon block and magnetic interlock with DB 15 connector wired for the printer.
- Printer stand and adapter plate (both needed together)
- Product detector
- Shaft encoder (required for dynamic printing, unnecessary for static printing)

*Videjet S25 marking on 12 pack chipboard cases. Configured to print straight out.*



*Proper beam shield construction and fume extraction positioning shown in the picture below. Fume extraction should be positioned as close as possible to the marking area to limit the lens-cleaning interval.*







**V**ideojet manufactures printing/marking systems that meet the highest standards of performance and reliability. VTI enforces strict quality control techniques to eliminate the potential for defects and hazards in our products. The intended use of the printer is to print information directly onto a product. Use of this equipment in any other fashion may lead to serious personal injury. All of VTI laser printers contain CLASS IV LASER.

The area immediately around the printing head must be protected with a PolyCarbonate shield. Any door or opening panel in the shield should include a safety interlock. Additional information can be found in chapter 2 of either Laser manuals.

In the United States, the user must appoint a Laser Safety Officer (LSO) who is thoroughly familiar with, and understands the provisions outlined in ANSI standards relating to laser users (Reference ANSI Z136.1). Training classes for Laser Safety Officers are available through the Laser Institute of America. A booklet entitled Laser Safety Guide is available from the Laser Institute of America.

***Laser Institute of America***

13501 Ingenuity Drive, Suite 128  
Orlando, Florida 32826  
Tel: (800) 345-2737; Fax: (407) 380-5588  
Web site: [www.laserinstitute.org](http://www.laserinstitute.org)

The international laser safety standard is IEC 825-1

European / International Laser Safety Standard - EN60825-1:2001 "Applications in Safe Laser Use and Laser Product Designs"

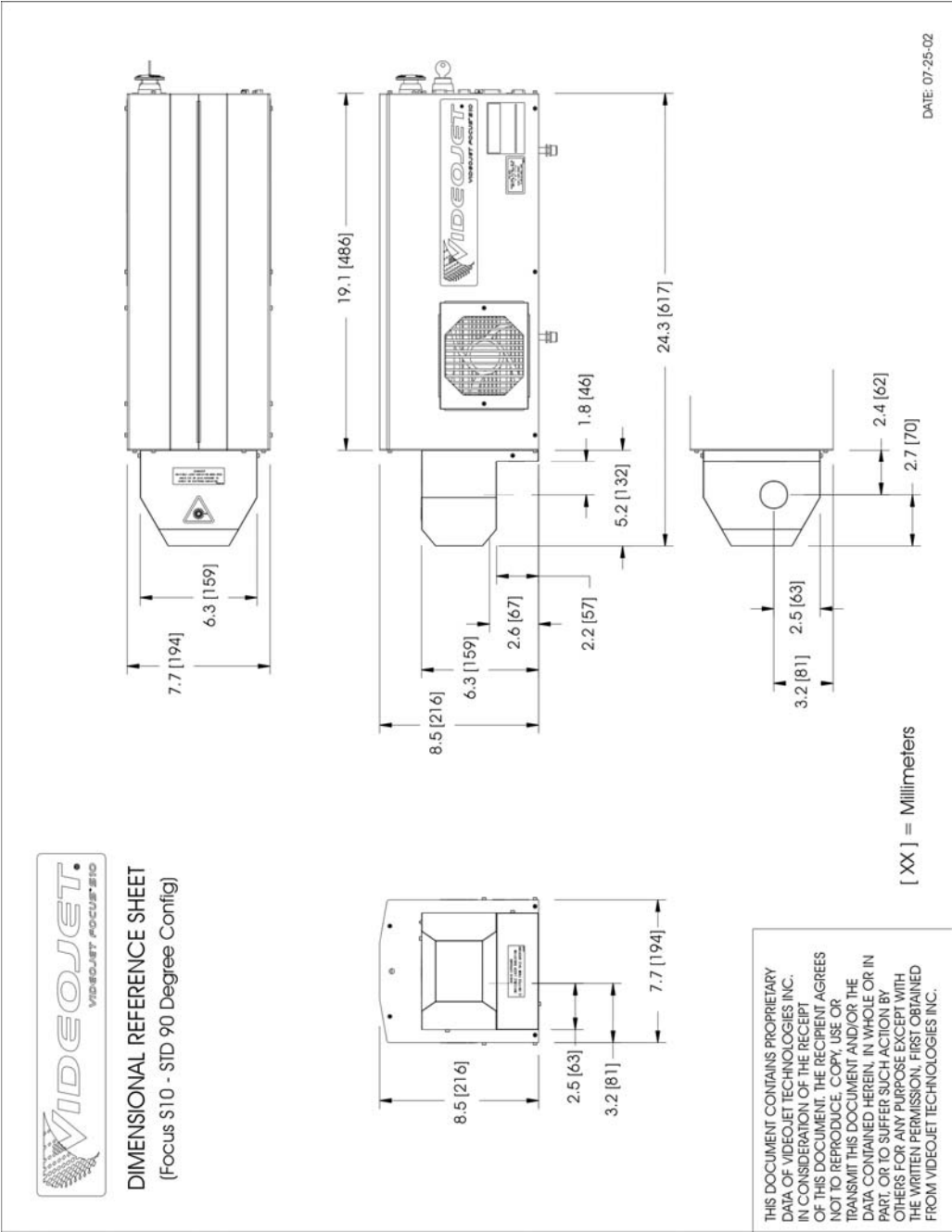
***International Electromechanical Commission***

***IEC Central Office***

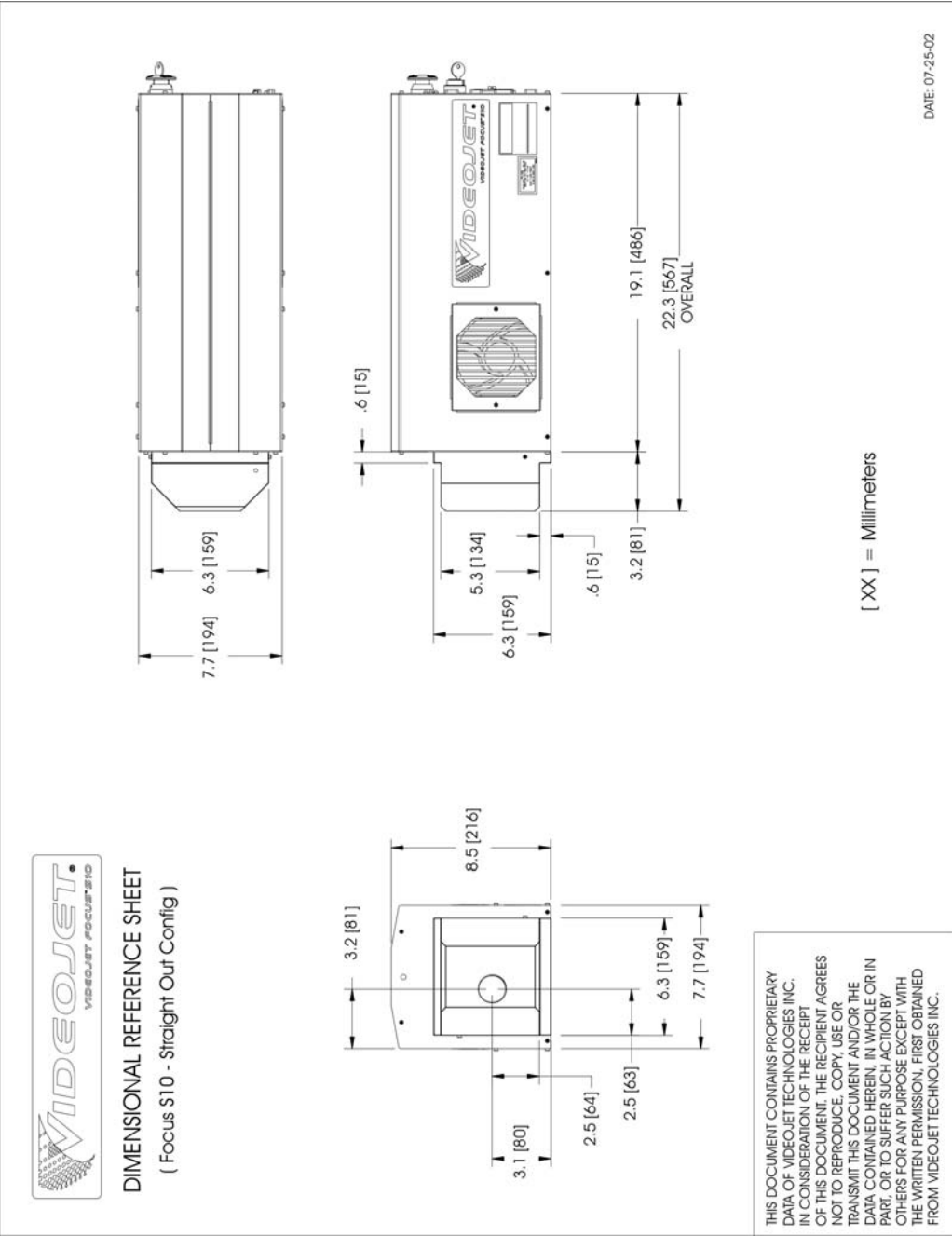
3, rue de Varembé  
P.O. Box 131  
CH - 1211 GENEVA 20  
Switzerland  
Phone: +41 22 919 02 11  
Fax: +41 22 919 03 00  
Web site: <http://www.iec.ch/>

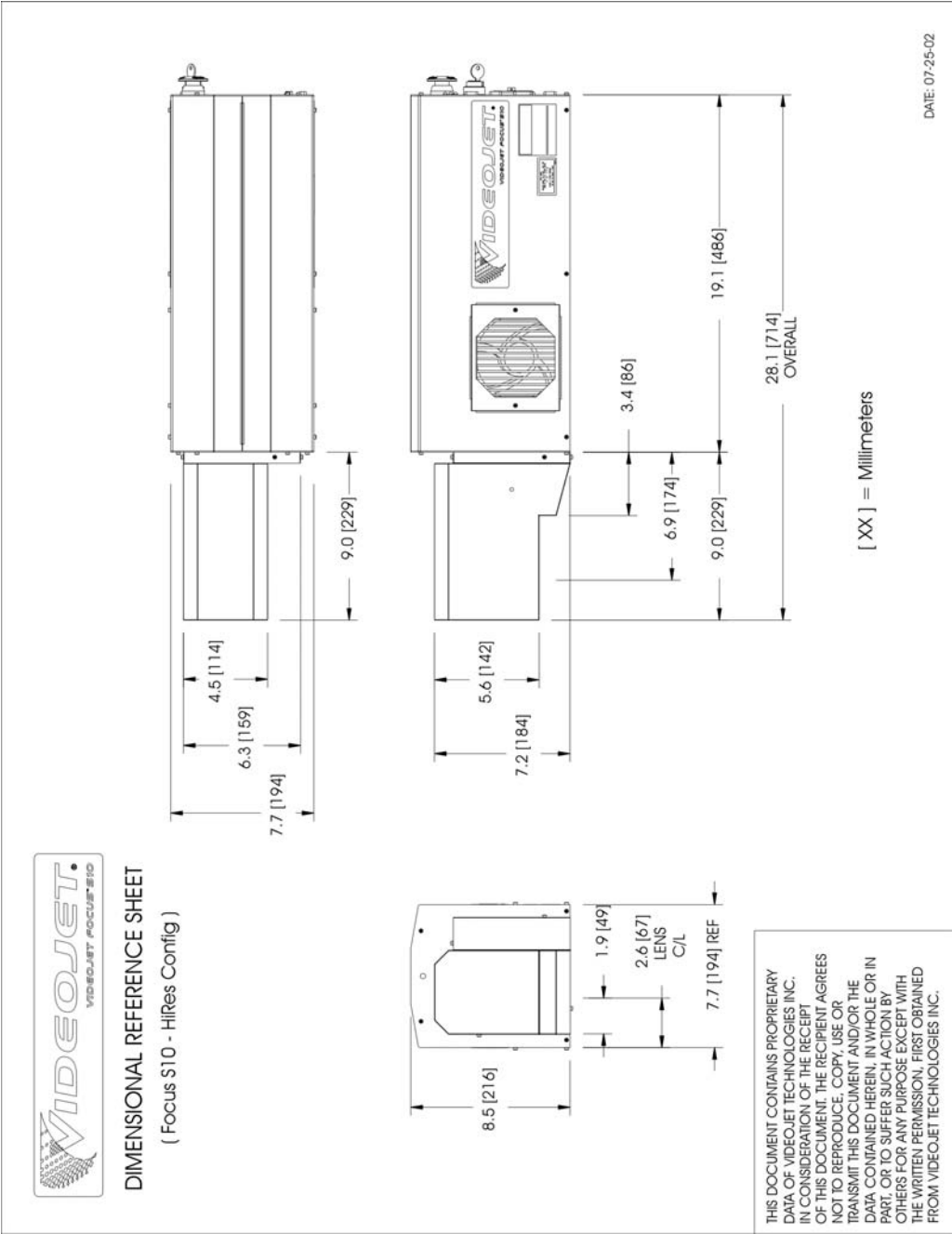
*International Radiation Protection Association*

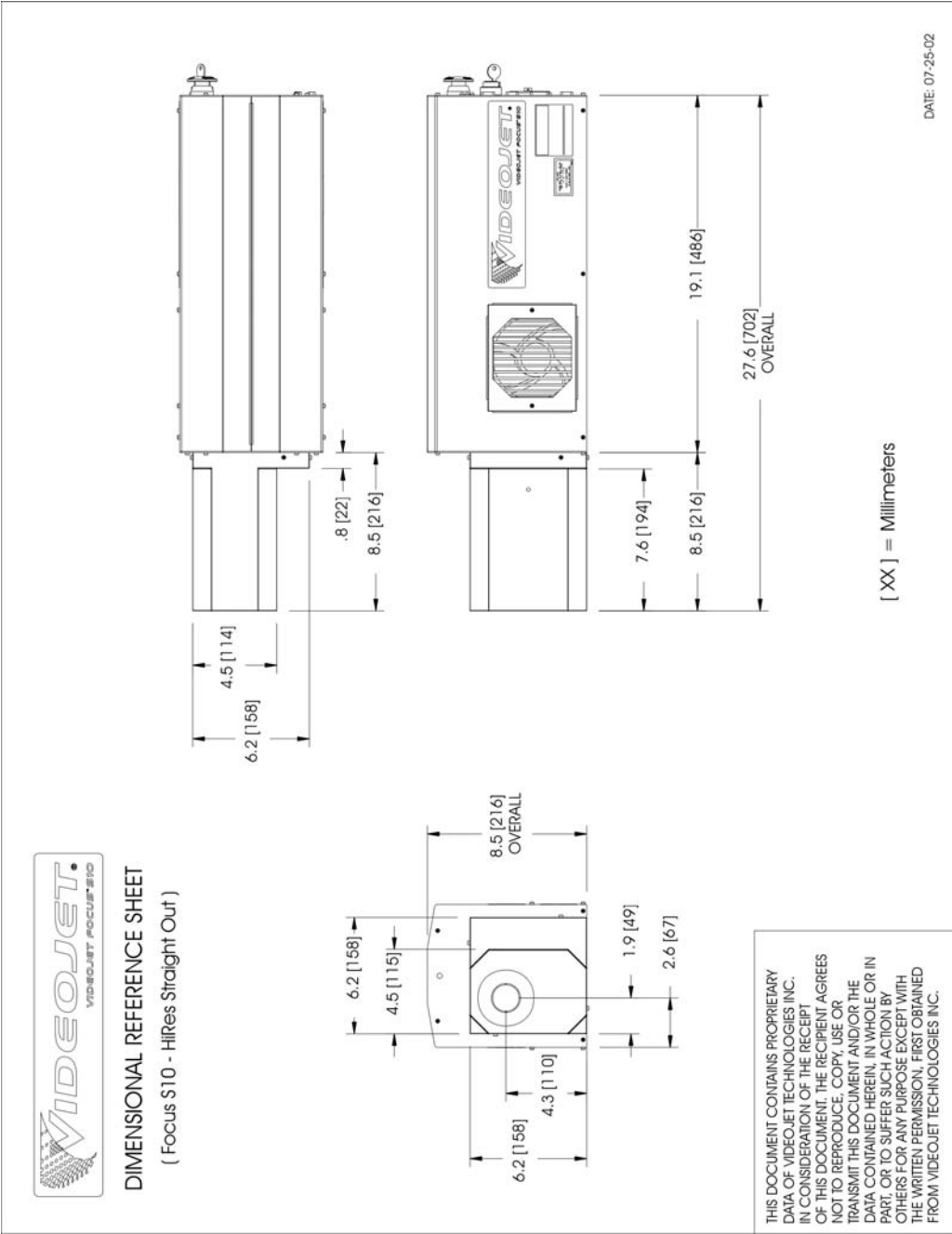
IRPA Executive Office – c/o CEPN Route du Panorama –  
BP 48 – F92263 Fontenay-aux-Roses Cedex – France  
Tel: +33 1 58 35 74 67 – Fax: +33 1 40 84 90 34  
Email: [irpa.exof@irpa.net](mailto:irpa.exof@irpa.net)  
Australian Standard – AS2211  
Web site: <http://www.irpa.net/>

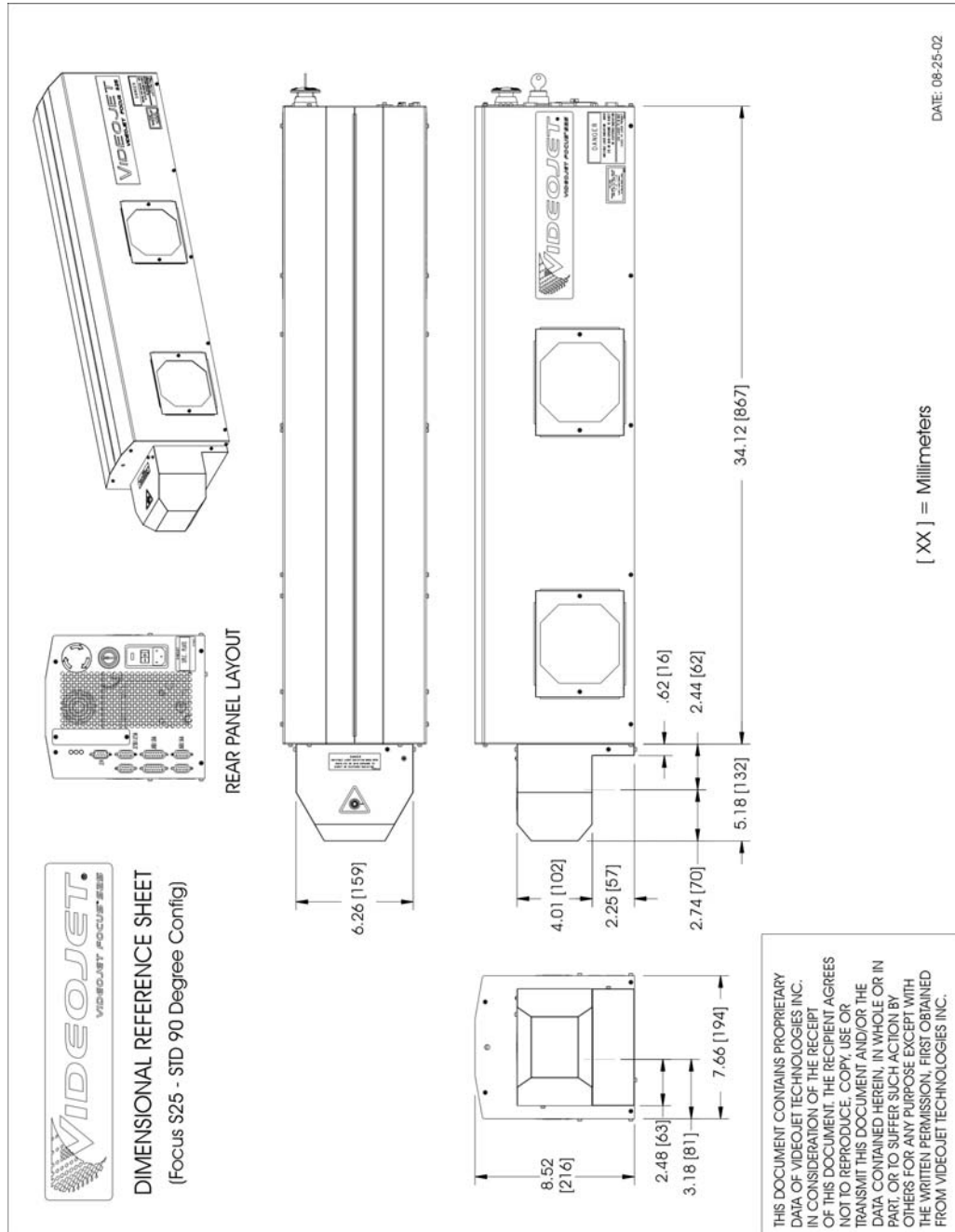


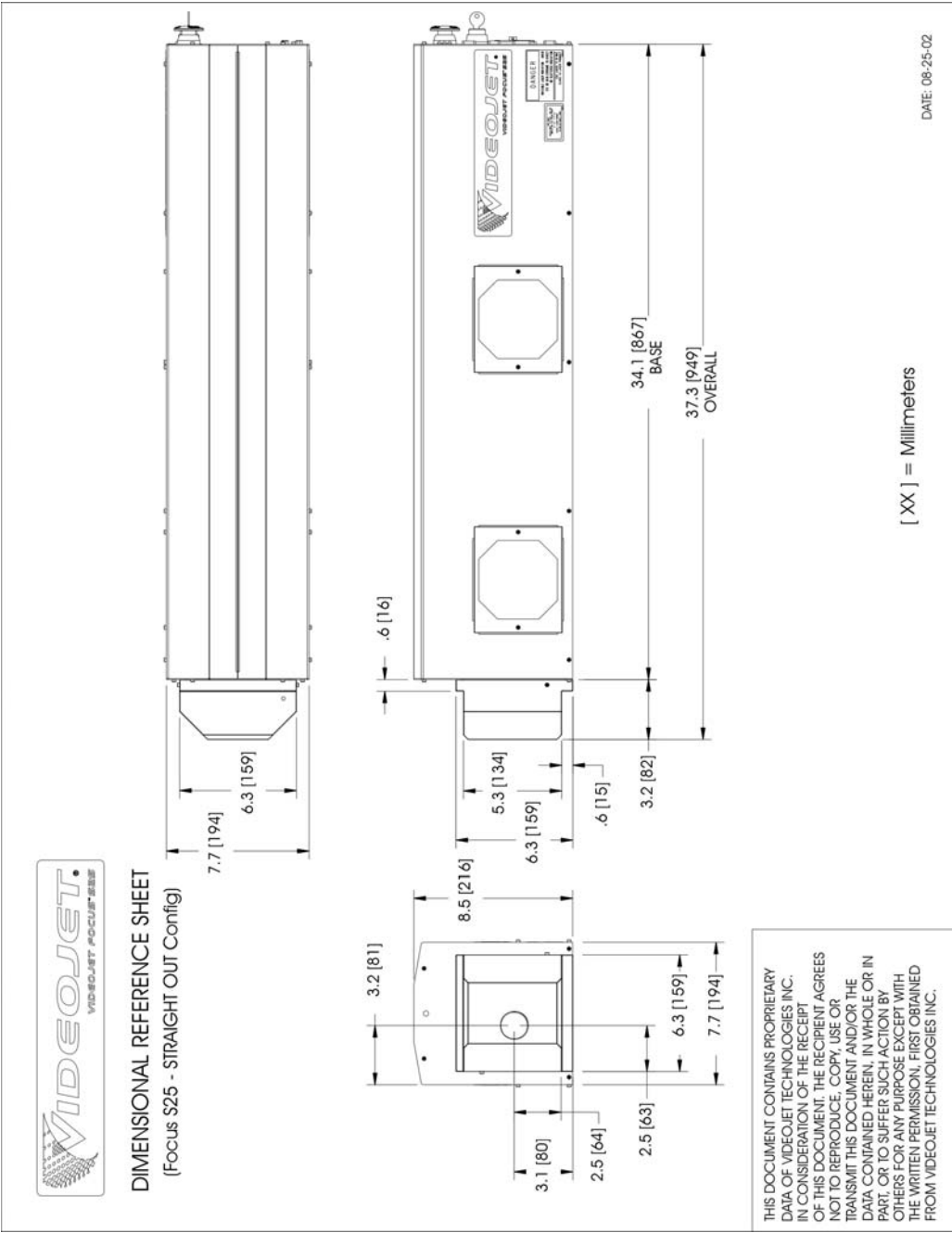


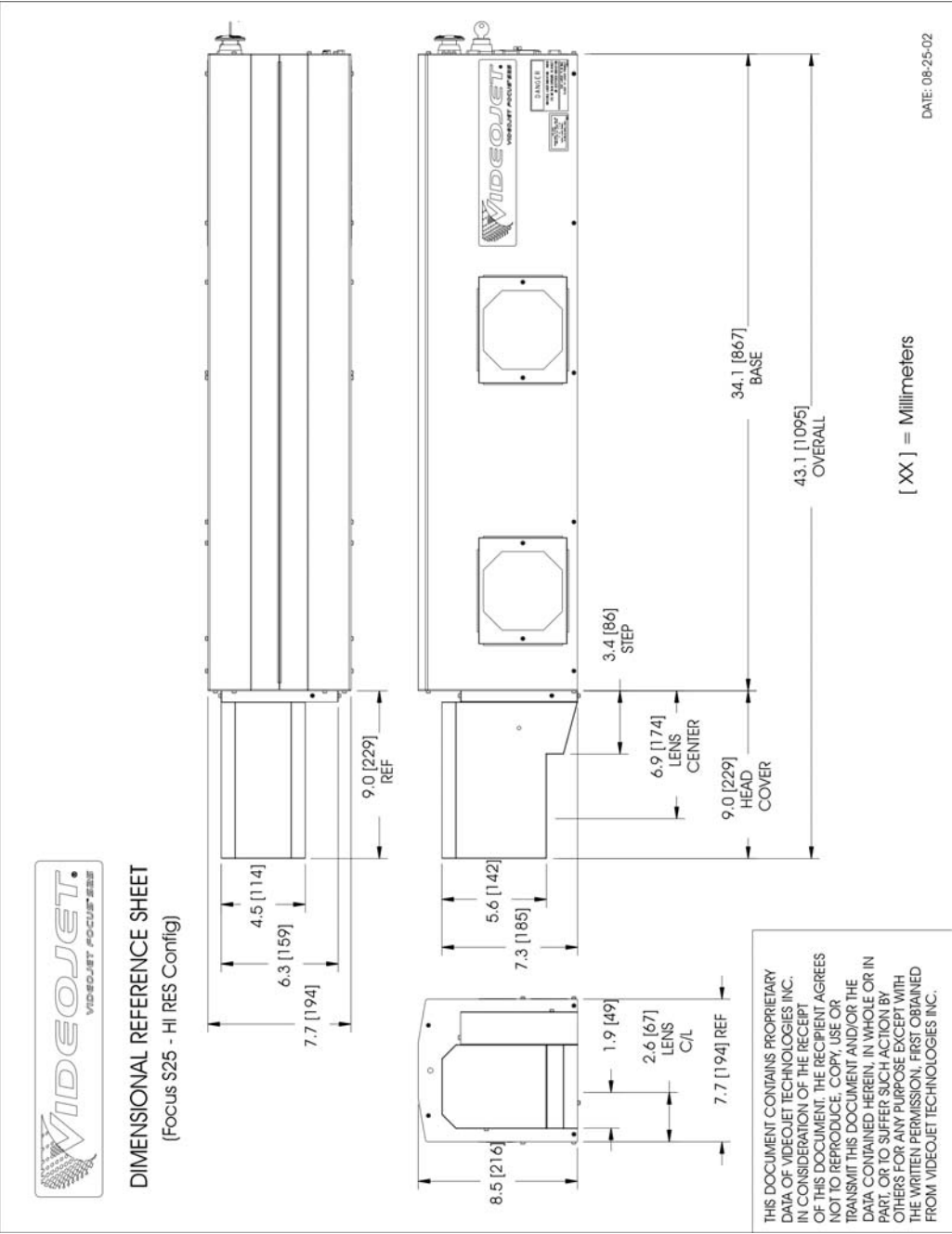


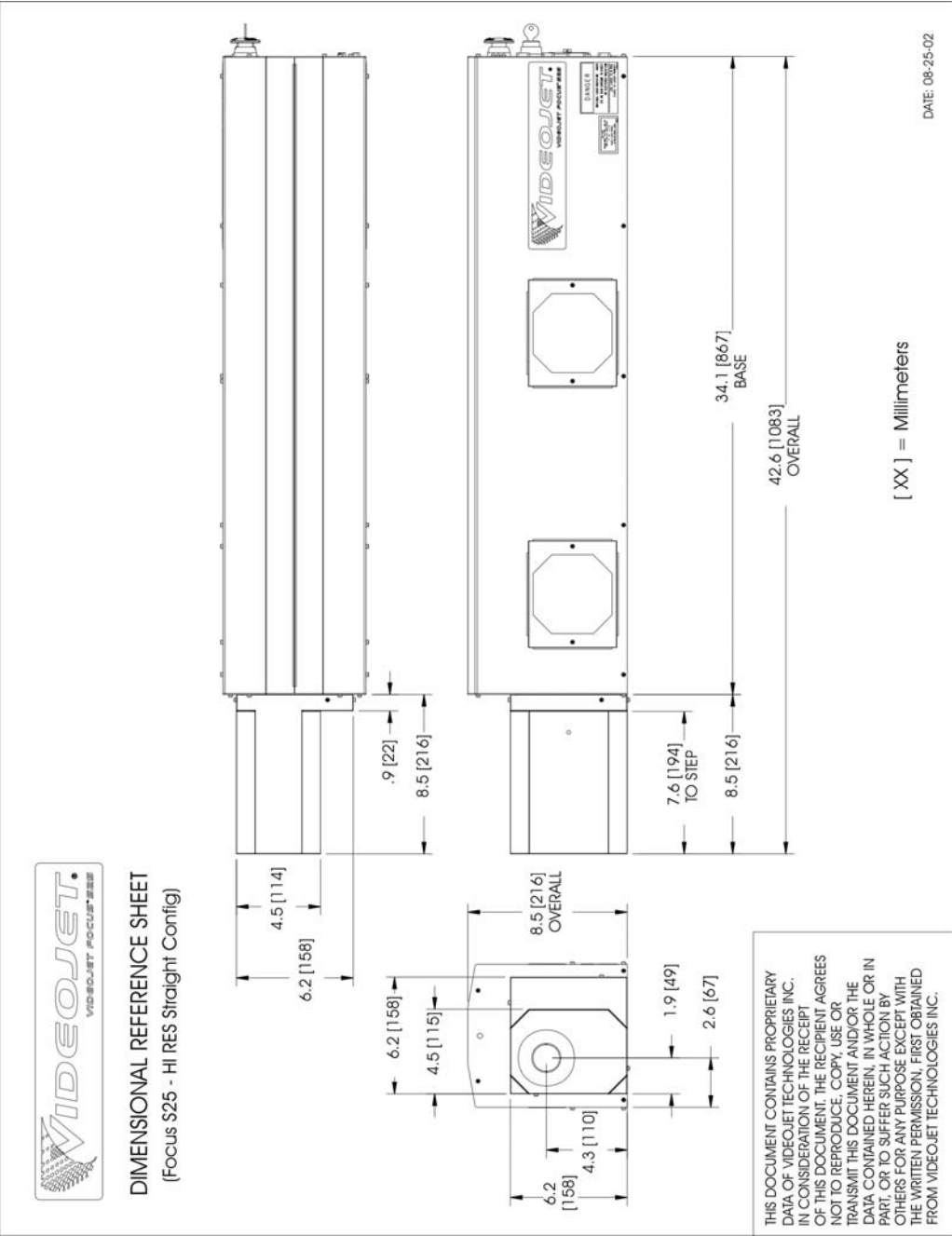


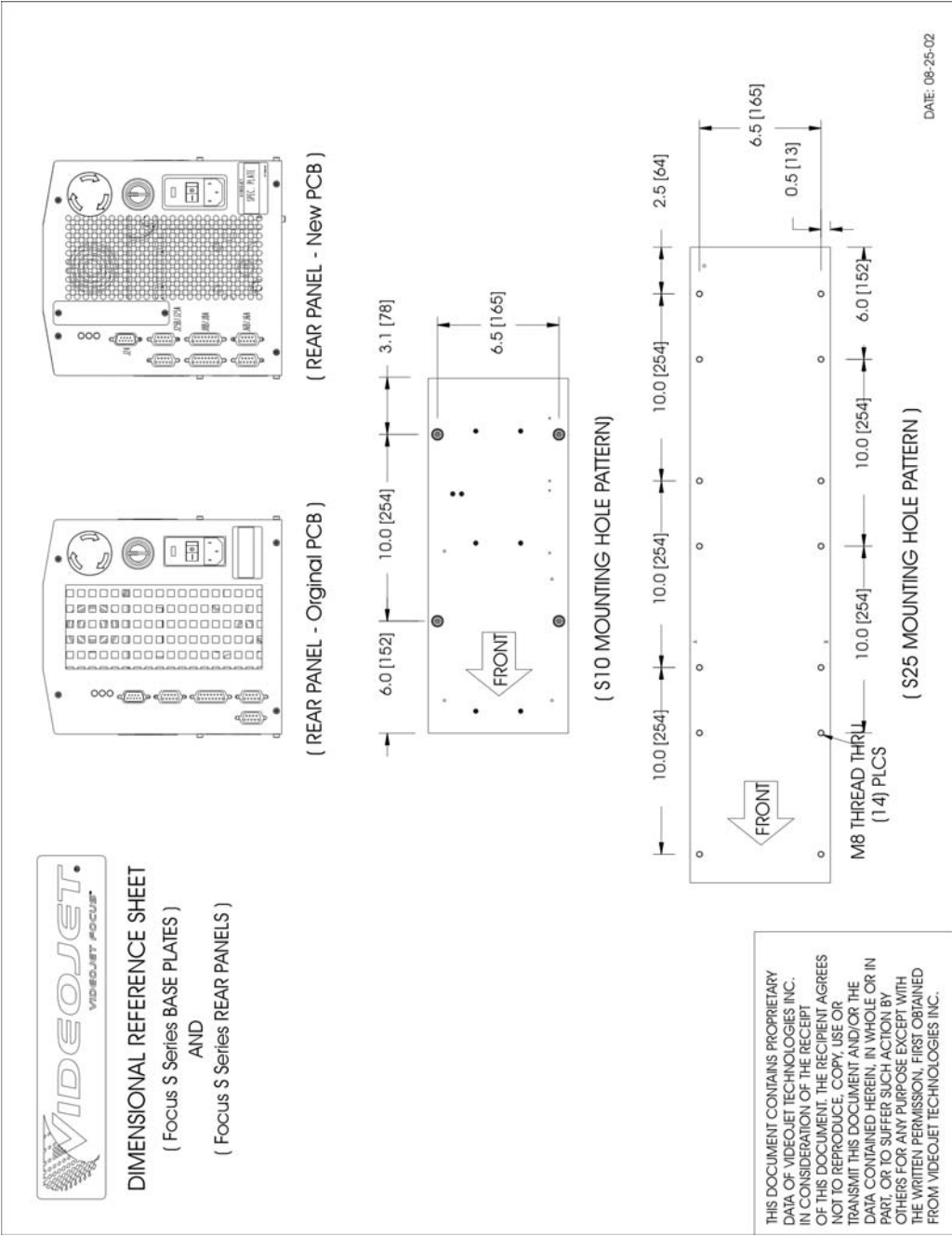




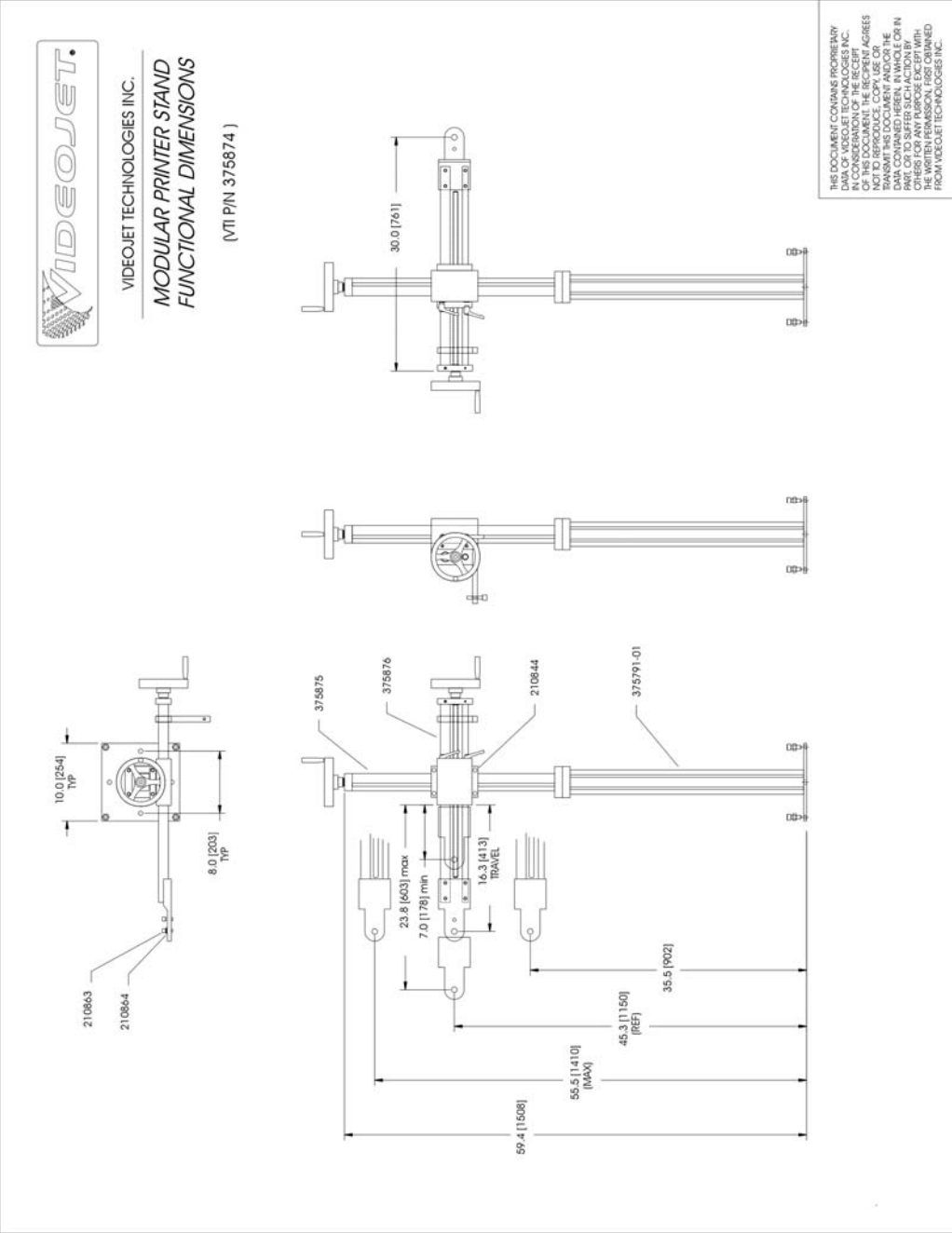


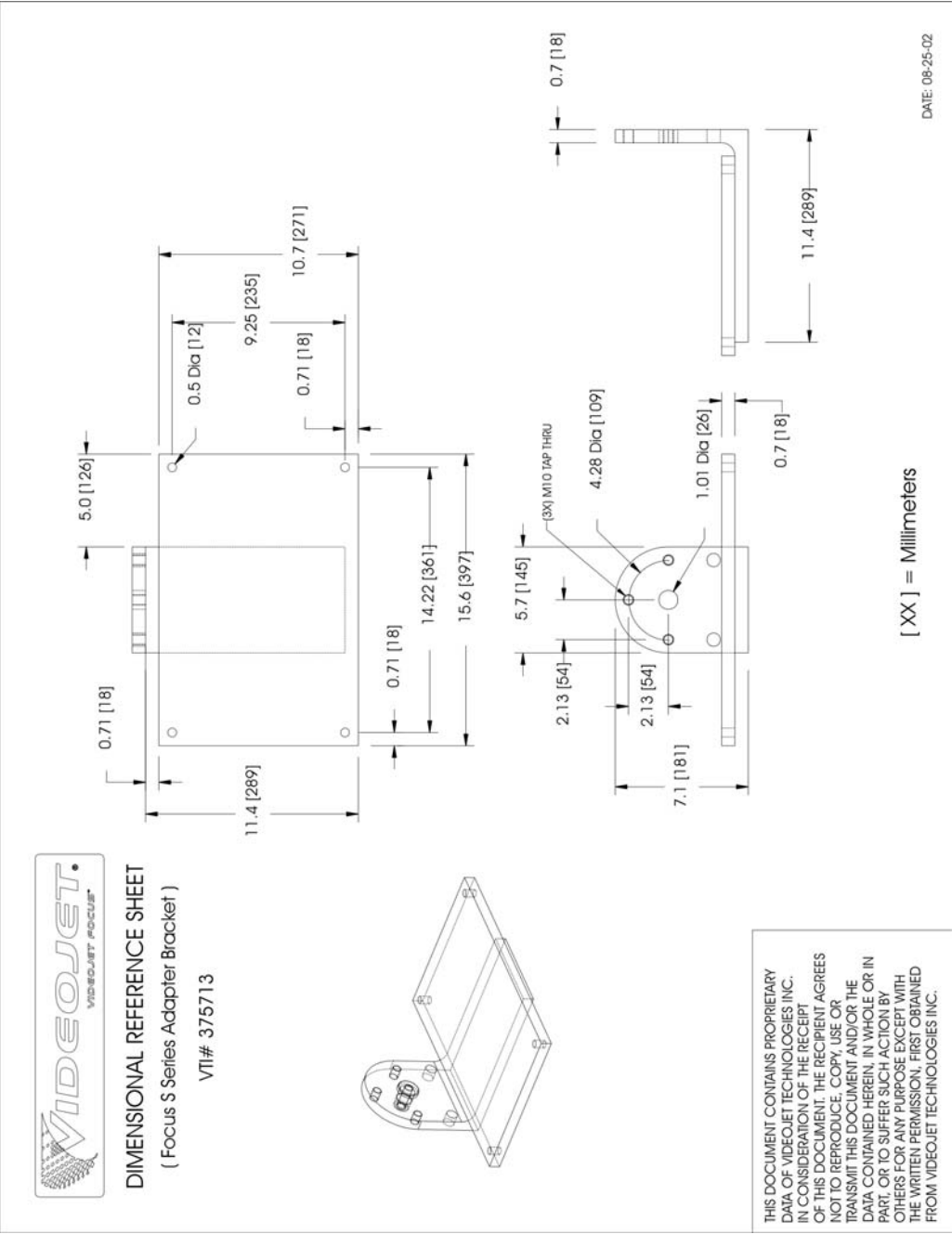


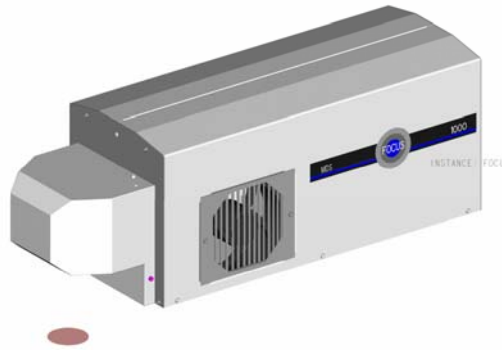










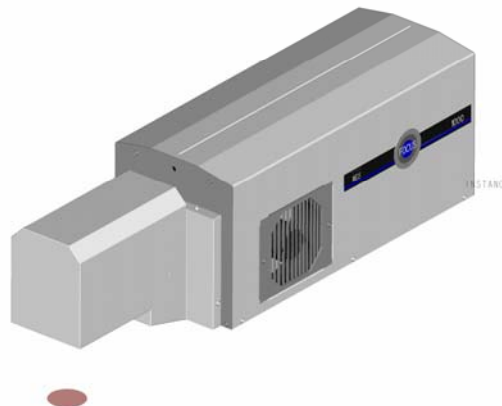


**"Standard"** Videojet Focus S10  
with **90 Degree** Printing  
Configuration.

[ P/N 375659 ]

Videojet Focus S10 with the  
Factory Installed **Straight Out**  
**Cover Kit.**

[ Kit P/N 375798 ]



Videojet Focus S10 with the  
Factory Installed **HiRes - 90**  
**Degree Configuration Kit.**

[ Kit P/N 375819 ]

Videojet Focus S10 with the  
Factory Install **HiRes - Straight**  
**Out Configuration Kit.**

[ Kit P/N 375780 ]



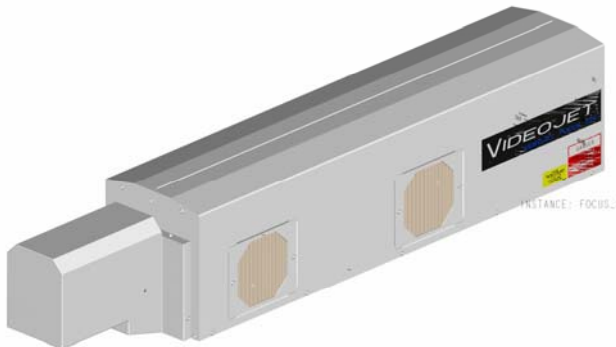


**“Standard”** Videojet Focus S25 with **90 Degree** Printing Configuration.

[ P/N 375840 ]

Videojet Focus S25 with the Factory Installed **Straight Out Cover Kit**.

[ Kit P/N 375798 ]



Videojet Focus S25 with the Factory Installed **HiRes - 90 Degree Configuration Kit**.

[ Kit P/N 375819 ]

Videojet Focus S25 with the Factory Install **HiRes – Straight Out Configuration Kit**.

[ Kit P/N 375780 ]

